FEBRUARY 1958

Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

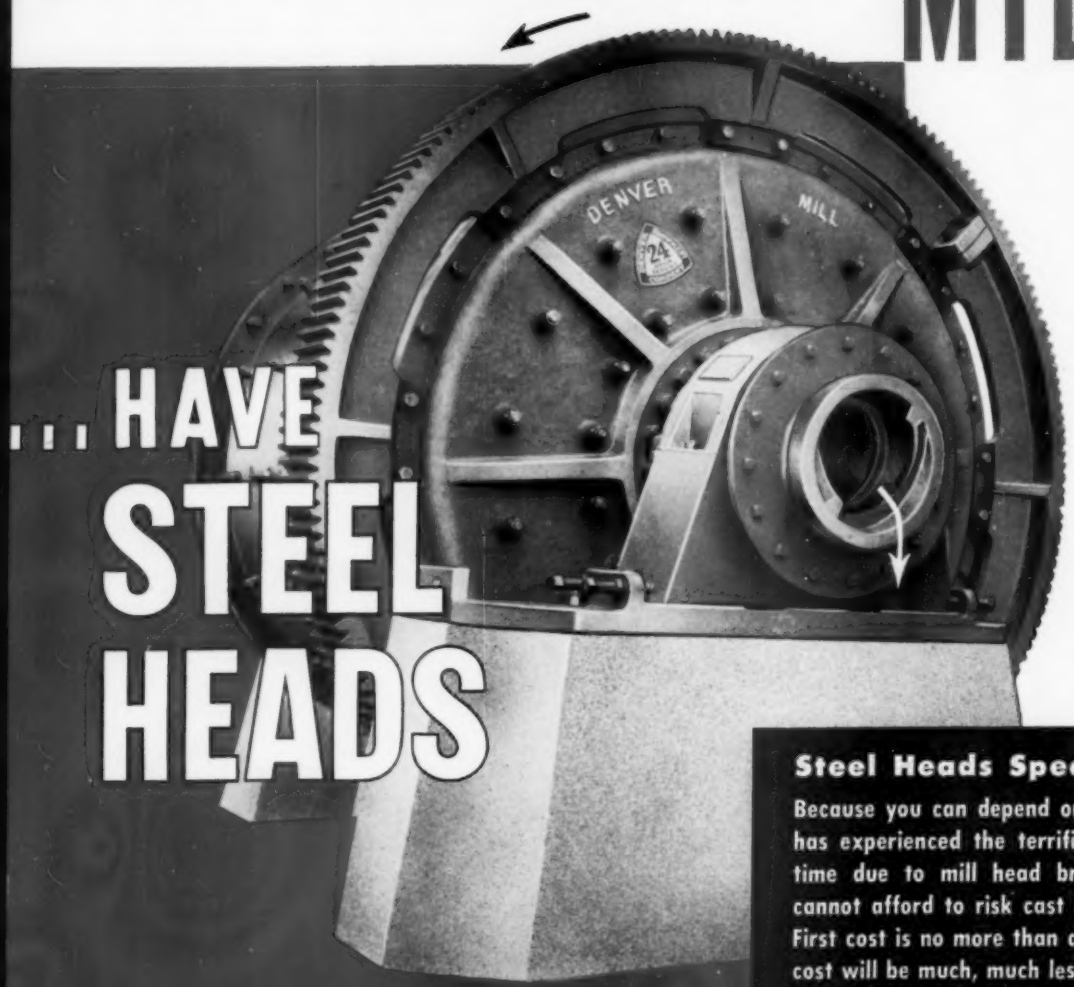
Thinking of expanding?

See page 140

Cement company aids Ontario's booming economy

See page 94

DENVER ball AND rod MILLS...



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Steel Heads Specified

Because you can depend on Steel! Anyone who has experienced the terrific loss of production time due to mill head breaking KNOWS you cannot afford to risk cast iron. SPECIFY STEEL! First cost is no more than alloy cast iron... end cost will be much, much less. Would you buy an automobile with a cast iron chassis?

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DENVER EQUIPMENT CO., 1400 Seventeenth St., Denver 17, Colorado

B.F.Goodrich report:

Extra-tough hose for rugged jobs is also light, easy to handle

THAT hose carries air and water to a drill, breaking up chunks of ore in a lead mine. The hose is dragged across sharp, abrasive rock. It's twisted and bent. It's subjected to hot air from the compressor. Such abuse would shorten the life of most rubber hose. But not the B.F.Goodrich Commander air hose pictured here.

The cover of this B.F.Goodrich air hose is made with a tough, oilproof rubber. It stands rough treatment, has high resistance to scuffing, cutting, gouging, tearing. Special wire-braid reinforcement makes this hose stronger, tougher—helps it take higher pressures, provides a greater safety factor.

The lining of B.F.Goodrich Commander air hose is made with a special rubber compound that stands hot air, won't harden, crack, or break into gummy particles to clog tools. Strong and rugged as this air hose is, it is still light enough to be carried around without effort, extremely flexible so that it handles easily, doesn't tire workers.

Where to buy: Your B.F.Goodrich distributor has exact specifications on the B.F.Goodrich Commander air hose. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for the mining industry. *B.F.Goodrich Industrial Products Company, Department M-269, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

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FEBRUARY 1958

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Cement firm aids Ontario's booming economy • *G. C. Lindsay* 94
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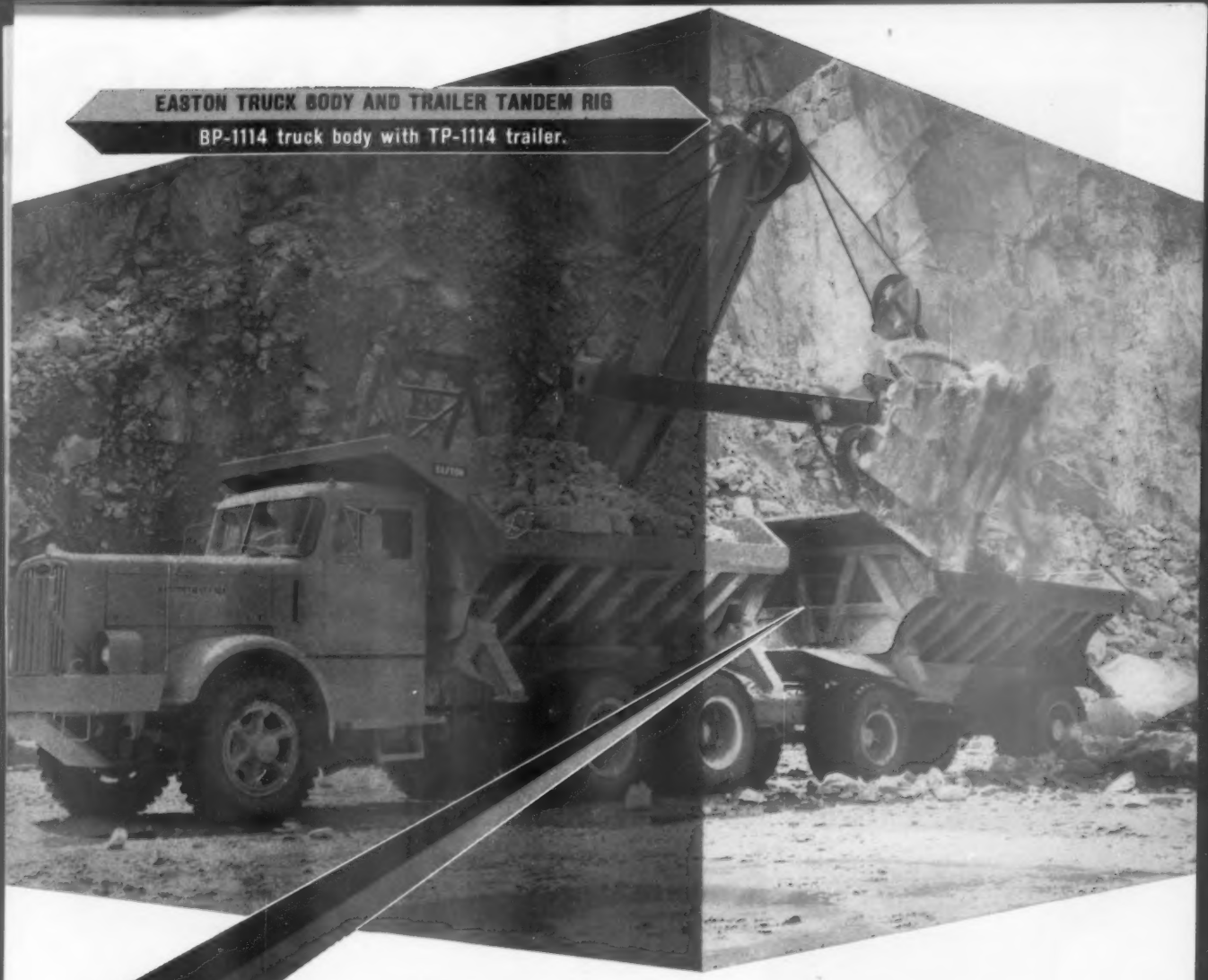
Germany—Georg J. Linder, Wittelsbacher, Allee 60, Frankfurt Am. Main.; James K. Binder, American Business Journals, Zoehringerstrasse 28, Berlin-Wilmersdorf.

ROCK PRODUCTS is published monthly by MACLEAN-HUNTER Publishing Corporation, 79 W. Monroe St., Chicago 3, Illinois: P. D. Allen, President; Copyright, 1957, by Maclean-Hunter Publishing Corporation. Entered as second-class matter, Jan. 30, 1930, at the Chicago, Ill., post office under the act of Mar. 3, 1879. Additional entry at Long Prairie, Minn.

SUBSCRIPTION INFORMATION
Subscription Price: United States and Possessions, Canada one year, $3.00; two years, $4.00; three years, $5.00. U.S. single copies, fifty cents. Pan American, one year, $8.00; two years, $14.00; three years, $20.00. All other foreign one year, $12.00; two years, $22.00; three years, $30.00. One dollar for single copies. Canadian subscriptions and remittance may be sent in Canadian funds to ROCK PRODUCTS P.O. Box 100, Terminal "A," Toronto, Canada.

To Subscribers—Date on wrapper indicates issue with which your subscription expires . . . In writing to have address changed, give old as well as new address. ROCK PRODUCTS is indexed regularly by Engineering Index, Inc. and the Industrial Arts Index.



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BP-1114 truck body with TP-1114 trailer.

FREE RIDES for Extra Payloads

A DOUBLE TRAILER TANDEM RIG with EASTON TD-1222H trailers.

TOTAL PAYLOAD with rugged EASTON tandem rigs can range from **28** to **72** tons, with half the payload riding on a free ticket! Several quarries have changed over to EASTON tandem hauling because they get **two** big payloads with **one** power plant and **one** driver. It's a chance for important savings! For quick information write, wire or telephone to EASTON now!

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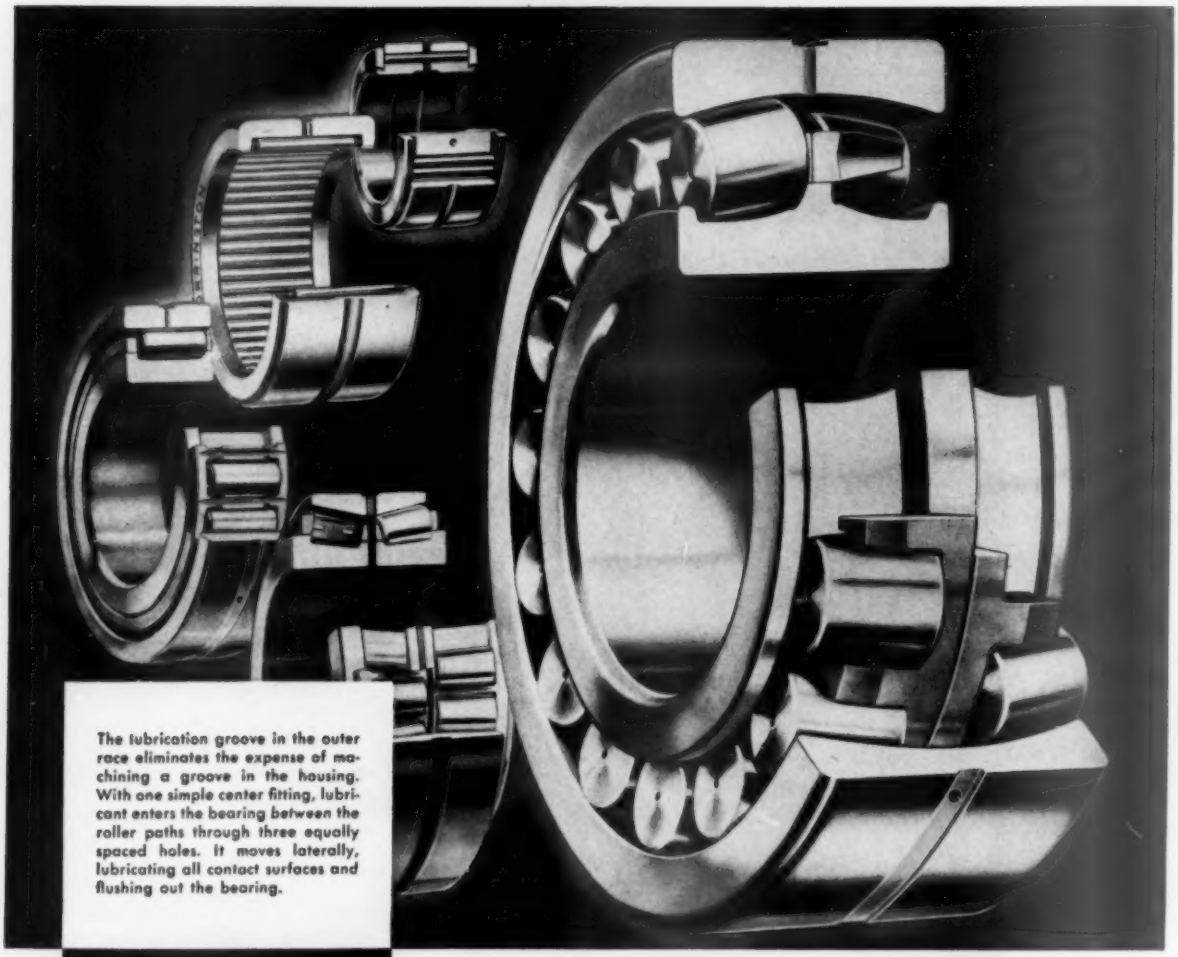
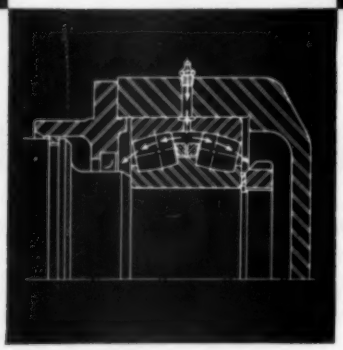


The lubrication groove in the outer race eliminates the expense of machining a groove in the housing. With one simple center fitting, lubricant enters the bearing *between* the roller paths through three equally spaced holes. It moves laterally, lubricating all contact surfaces and flushing out the bearing.



A time-proved lubricating method now available on Torrington Spherical Roller Bearings

The circumferential groove in the outer race has met the test of experience in many Torrington Bearings, including Heavy Duty Needle Bearings, Aircraft Type Needle Bearings, Tapered and Radial Roller Bearings. Now the circumferential lubrication groove is available in Torrington Spherical Roller Bearings.

This design feature makes it possible to introduce lubricant *between* the roller paths without the expense of machining a groove in the housing. This groove is proportioned to provide generous lubricant flow capacity. Lubricant moves through the roller paths, flushing used lubricant and contaminants away from bearing contact surfaces.

Torrington Spherical Roller Bearings in many sizes may be ordered with this groove as desired at no additional cost. For further information, see your Torrington representative or write: **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

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IT EATS IT!

Rock!—all Northwests are *real* Rock Shovels and the Northwest Model 41 (within its capacity) is just as tough as the big 80-D.

Here is a quarry of the Hall & Riley Quarries and Construction Co. at Boonville, Mo. The 1 yd. Northwest Model 41 is their 3rd Northwest machine—their second repeat order—and *rock* is their business. This is another of the many repeat order buyers in the Missouri, Kansas, Oklahoma, Nebraska area.

The Northwest Model 41 is a full 1 yd. Shovel, capable of delivering the output you expect from a 1 yd. shovel. With plenty of power and the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels *waste*, you have digging power plus. But, there has to be more than that behind the digging end of a *real* Rock Shovel.

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The "Feather-Touch" Clutch Control provides power operation of the main drum clutches and retains the *feel of the load* that makes for smooth handling in nudging out the big ones. Ease of operation is accomplished without resorting to valves, pumps and delicate mechanisms. Uniform Pressure Swing Clutches eliminate the jerks and grabs that increase swing time and cause spillage. The Cushion Clutch reduces engine dragdown and stalling and eliminates shock overloads before they reach machinery.

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Only your Caterpillar Dealer offers "Bonded Buy." It's protection up to $10,000 when you buy a used Caterpillar-built machine. Here's how it works.

When you make a "Bonded Buy" purchase from your Caterpillar Dealer on any used Cat-built machine, he gives you his Guarantee Bond of up to $10,000, assuring you of satisfactory performance of all parts for a period of 30-90 days. His bond is backed by a master bond issued by Lumbermens Mutual Casualty Co. Its assurance is effective anywhere in the U. S. and Canada.

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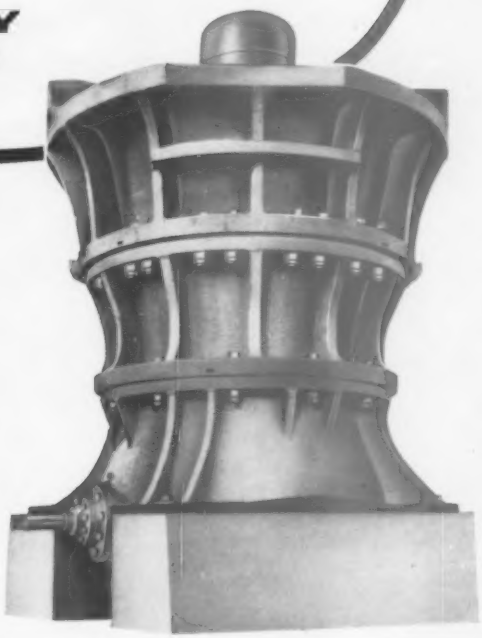
Traylor-MADE

TC GYRATORY CRUSHER



26" Bulldog Gyratory Crusher in zinc and lead producing plant.

Over a half-century of engineering experience is built into Traylor Gyratory Crushers. Original self-tightening bell head and curved concaves—patented dust seal—positive outside automatic lubrication system are a few of the features of the Traylor TC Gyratory Crusher. Made in seven sizes with feed openings 20" to 60" and capacities from 1240 to over 32,000 tons per eight hour day. For specifications, ask for Traylor Bulletin No. 1126.

Traylor

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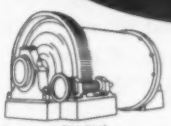
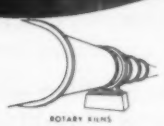

BALL MILLS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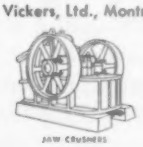
PRIMARY GYRATORY CRUSHERS


JAW CRUSHERS

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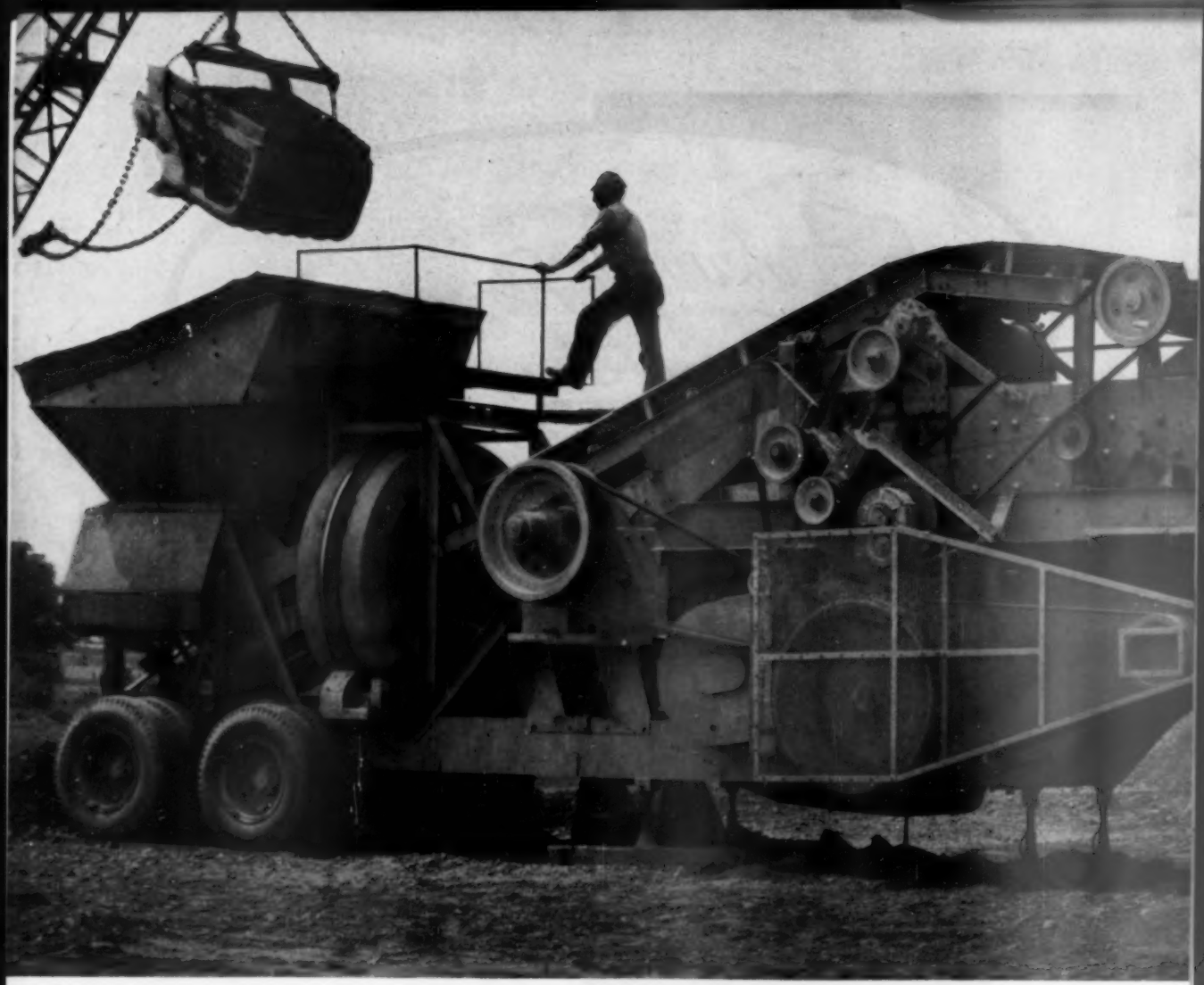

Up-to-date, streamlined lubrication method pays significant dividends in maintenance savings . . .

Texaco Simplified Lubrication Plan

Plan can reduce lubricant inventory and improve lubrication. It can mean more productive manhours, less repair costs, less time lost

If you are using more than six lubricants for your major lubricating jobs, chances are your maintenance costs are a lot higher than they should be. Storage problems, handling costs, and the dangers of misapplication are often costly results of stocking more lubricants than you need.

Texaco Plan cuts number of lubricants needed. Specifically tailored to your operation by your local Texaco lubrication representative, this new plan can cut your requirements down to no more than *six* lubricants for *all* your major maintenance needs. Yet the Plan is simple to put into action; it's quick; and above all, it can save you a significant amount of money.

How the Texaco Plan works

The Texaco Simplified Lubrication Plan is based

Photo courtesy Iowa Mfg. Co.

on a proven combination of multi-purpose and specialty lubricants—varied to meet your particular requirements. For example, multi-purpose *Texaco Marfak Heavy Duty Special 2* might be specified for all chassis, wheel bearing, water pump and other grease lubrication. Its wide temperature range, water resistance, and ability to "stay put" generally make this *Marfak* grease ideal. Then a special application, like track rolls lubrication, would probably be filled by *Texaco Track Roll Lubricant*—specifically designed to protect them against rust and wear. And so on. Your Texaco lubrication representative is well-qualified to go down your list of lubrication needs, to see that your particular operation gets the *best* in modern lubrication with the *minimum* number of lubricants.

Get the full details

Your local Texaco lubrication representative can give you complete information on the *Simplified Lubrication Plan*. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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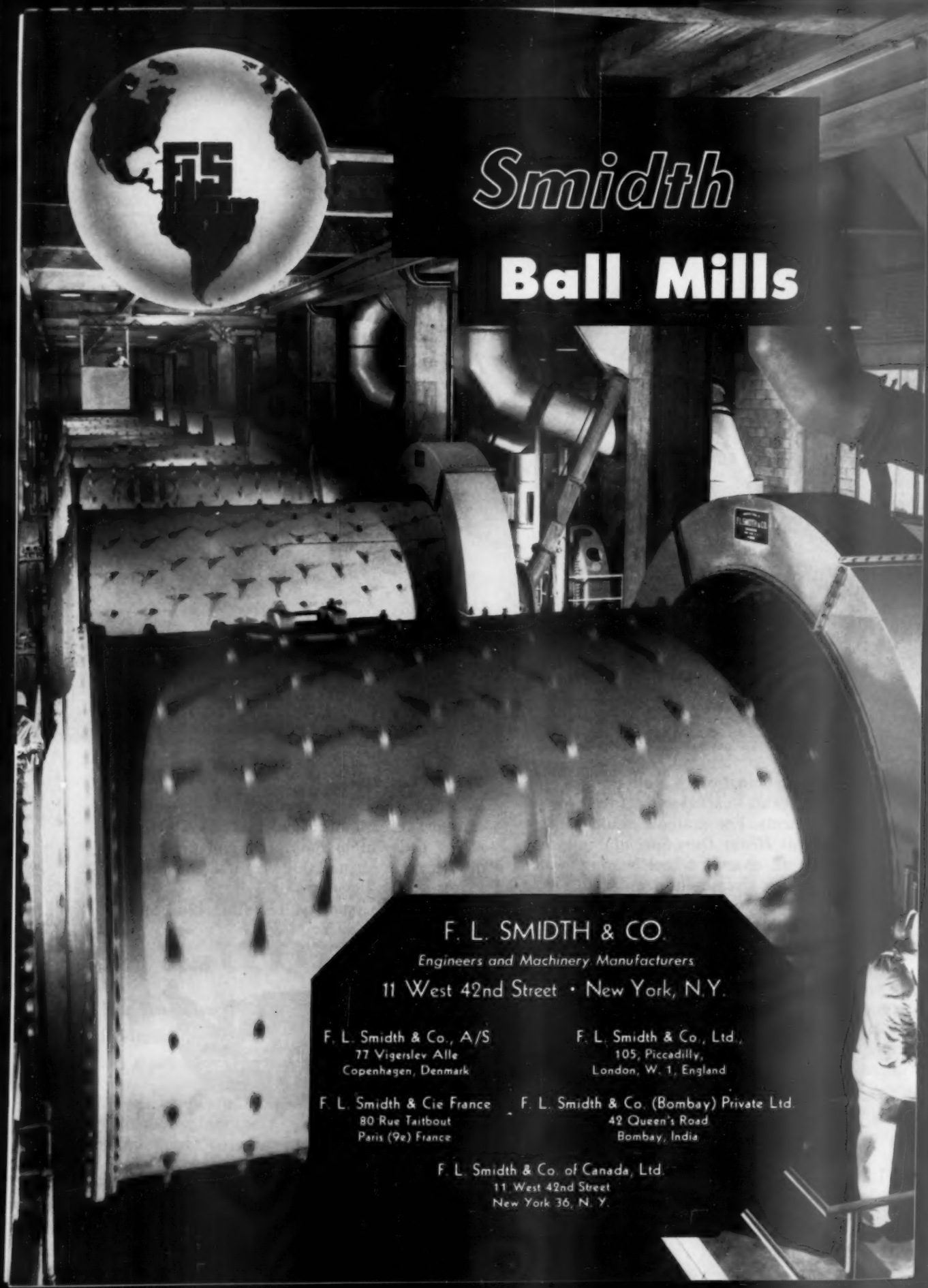
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What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

February, 1958

A new mining rush in the Mojave Desert of Southern California is centering around the town of Boron. Emphasis is on the borates, and one of the largest leases was signed by Kerr-McGee Oil Industries, Inc. and Southern Pacific Land Co. Kerr-McGee signed up 14,885 acres in Kern and San Bernardino Counties, leasing rights to salines and other evaporites, including compounds of sodium, potassium and boron.

Giving an assist to the plant watchman is the function of a telephone alarm, "Electronic Sentry," which has been developed by Electronic Secretary Industries, Inc., a subsidiary of General Telephone Co. It can be leased by the month. When a primary detecting device, such as a thermostat, burglar detector, water level gauge or other control signals an alert, the Sentry dials a predetermined number and plays a prerecorded message informing the person who answers the telephone of the danger.

Expenditures for new construction put in place during November, 1957, totaled $4.1 billion, a record for the month, according to the Departments of Commerce and Labor. They were down seasonally from the $4.5 billion of October, but up from the $4 billion of November, 1956. Privately financed work at $3 billion was off four percent from October, but up one percent from a year earlier. Publicly financed construction, at $1.1 billion, was down 17 percent from October; up 12 percent from November the year before.

The 108-mile pipeline for carrying coal in slurry form from Pittsburgh Consolidation Coal Co.'s Georgetown, Ohio, mine to the Eastlake, Ohio, power station of Cleveland Electric Illuminating Co. (What's Happening, November, 1956, p. 13) is getting closer to operation. Originally scheduled to start last March, the project has met with delays. Now, however, test batches of the coal reportedly are running through the slurry pumping, dewatering and drying processes successfully and already help fire CEI's boilers.

Emanating from Okayama, Japan, is the report that scientist Zenjiro Hirai has developed a substance "better than concrete" for use in protecting workers from radiation. Called deledate, it contains bentonite, sand, iron, cobalt and barium chloride.

A new service is coming out of Washington via the Office of Construction Statistics which has been established in the Department of Commerce. The new unit, a part of the Business and Defense Services Administration, will conduct fact-finding activities on major aspects of the construction industry, such as volume, costs, materials and production.

A revolutionary method of smelting low-grade iron ores has reached the pilot plant stage with plans for a $1 million installation. The process, developed by the Ontario Research Foundation, involves the injection of a stream of magnetic ore into a gas-fired cyclone furnace—producing a continuous stream of molten iron. The pilot plant probably will be erected at the head of Lake Superior where vast quantities of cheap natural gas and millions of tons of the ore are available. **The Financial Post,** reporting the development of this new industry for northwestern Ontario, said that its actual sponsor is not known. However, the government of Ontario and major iron producers and gas companies are watching the process with interest.

Treating track ballast with asphalt is the subject of a research program sponsored jointly by Association of American Railroads and Asphalt Institute. The latter will provide railroads with experimental equipment developed by manufacturers of stone spreading and asphalt distributing devices. Tests are to be conducted by engineering representatives of the association. Track maintenance costs, says the Asphalt Institute, could be cut by 60 percent through use of asphalt-treated ballast.

A continuous-process tunneling machine is being developed in England to increase the speed of tunnel driving. It is designed to cut an 18-ft. diam. circular tunnel and will allow other operations, such as roof supporting, track laying and installation of other services to be carried on simultaneously. Rock debris may be scooped up in buckets fixed to the outer cutting head and discharged to the first of a series of 40 ft. long conveyors attached to trolleys running on a monorail. An exhaust system provides ventilation, and methane recorders, emergency lighting and communication systems also will be part of the unit.

Prefabrication of brick wall panels has been tested by Structural Clay Products Research Foundation and reported in **Engineering News-Record.** A one-story dwelling in Geneva, Ill., was constructed of the panels, which are 8 ft. high, 1 ft. wide and 2½ in. thick. Brick were set in stack bond at the plant and tied together with fast-setting grout. During construction, they were bolted top and bottom to horizontal steel angles. Vertical joints between them were power-mortared.

The "piggyback" method of transporting loaded truck-trailers on railroad flatcars has gone commercial in Canada. Until recently Canadian Pacific Railways and Canadian National Railways have made use of piggyback with their own road transport service. Now the service is available for private truckers' trailers between Montreal and Toronto.

A special asbestos cloth has been perfected for the Italian Air Force. Produced with pure asbestos fibers, the cloth can withstand 500 deg. C. temperature. It is covered with an aluminum-silicon varnish, and although it is very light, it is said to have exceptional textile strength.

The editors

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Why buy 2 rigs...when 1 will do?

New Case® TerraTrac®

"2-in-1" Loader-Dozer

Saves investment!
Cuts operating cost!

If you need a front-end loader, as well as a dozer — but don't have full-time work for *both* — there's no longer any need to buy *two* machines and hire *two* separate operators to run them.

Now, for only a few dollars more than the cost of a *single*-purpose rig, you can get a *multi*-purpose Case TerraTrac crawler, with combination loader and dozer. This gives you the *versatility* of two highly efficient work-tools, with the *economy* of one tractor, one hydraulic system, and one operator.

With optional *bulldozer or angledozer*, you can clear land, build access roads, do light stripping, filling, etc. Then you simply pull four pins . . . detach dozer and lift arms . . . and you're ready in 5 minutes to work the *loader* . . . for loading trucks and hoppers, stockpiling, materials-handling, clean-up, and many other jobs.

Capacities up to 2 cu. yds.

Case TerraTrac combination loader-dozer units are available in 10 gasoline and diesel-powered models — *from 42 to 100 HP, with ⅝ to 2-cu. yd. buckets.* Largest models feature torque-converter drive and exclusive counter-rotating Terramatic transmission, with instant power-shift, and power-steering, which give you much higher working speeds and greater ease of maneuverability than any conventional crawler tractor. These larger Case TerraTrac units also give you the important advantage of torsion-bar track suspension and automatic track roller lubrication, which cuts greasing time from once a day to a few times a year. Mail coupon today for complete facts on sizes best suited to your needs.

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the ultimate in low cost

Wear O Matic

WIRE FEED UNIT

- Positive feed drive rolls.
- Light-weight one man portability in shop or field.
- Priced right—$279.00 F.O.B. York, Pa. or El Segundo, California

Test this new combination in your own shop. Write stating type of work to be done. An Alloy Rods Company representative will set up a machine for your use.

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Wear O Matic

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- Tension free wire feeding.
- Quick and simple wire change over.
- Accessibility and ease of operation.

Here's a new hard surfacing combination designed to cut maintenance costs through easier, faster, more economical application of wear resistant alloys.

From your first experience with the new Wear-O-Matic process, you'll appreciate the many conveniences of the *PAYOFFPAK*. The wire is cleaner and easier to handle and is free of tension for smoother trouble free wire feeding. Larger quantities of wire can be handled with greater ease of change over. There's no kinking or snarling of wires as is common with cumbersome, tightly wound coils.

Wear-O-Matic wire and the new Wear-O-Matic wire feed unit is the labor saving team that will ease your maintenance load. Welding is easy and continuous at speeds up to five times faster than manual electrodes. The Wear-O-Matic unit feeds the wire automatically at the proper pre-selected rate. There's no stopping to change electrodes, no stub loss, no cleaning, and spatter is negligible. And, Wear-O-Matic wires provide weld deposits of uniform metallurgy, chemistry, and wear resistance . . . assuring longer equipment life.

WEAR-O-MATIC
Hard Surfacing Wires

WEAR-O-MATIC 3—A build up alloy with a machinable deposit. Hardness 20 Rc.

WEAR-O-MATIC 4—A build up alloy which also has exceptional wear resistant qualities. Non-machinable. Hardness 40 Rc.

WEAR-O-MATIC NICKEL MANGANESE—
A build up alloy for manganese steel parts.
Hardness 190 Brinell as welded
500 Brinell work hardened

WEAR-O-MATIC 12—Hard surfacing alloy for heavy impact and moderate abrasion resistance. Hardness 52 Rc.

WEAR-O-MATIC 15—Hard surfacing alloy for severe abrasion and medium impact resistance. Hardness 60 Rc.

WEAR-O-MATIC 40—Hard surfacing alloy for severe abrasion and light impact. Hardness 58 Rc.

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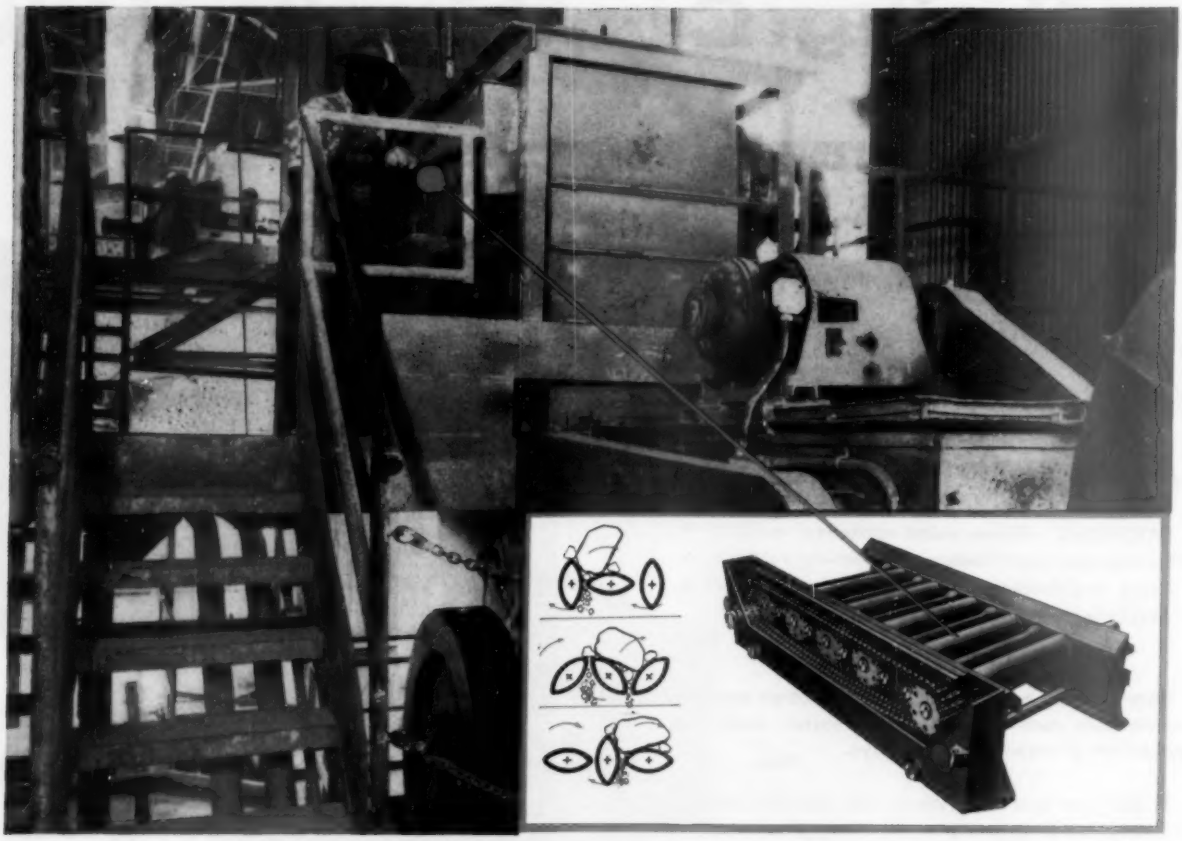

The Universal Wobbler Feeder makes possible a 50% increase in raw material production

at the Lone Star Cement Corporation's Demopolis, Alabama plant

The plans to increase cement production called for the addition of a third kiln. The existing hammermill could not supply the required amount of fines to feed three kilns. And the cost of another hammermill would have been prohibitive.

The Problem was solved by installing a Universal Wobbler Feeder. It increases hammermill capacity by screening out ½" fines. The hammermill is then free to work only on oversize. At present the Wobbler and hammermill are operating at ⅔ capacity. However, when the new kiln is put into service it is expected that plant capacity will be increased 50%.

The Wobbler has been in service since June 1956 and has had no down-time. It does its job of screening ½" material, 24 hours a day, seven days a week, without requiring any maintenance.

The basic material in making cement at Demopolis is Selma chalk, a soft rock substance containing 14% moisture by weight. When crumbled, the material has a tendency to stick. However, the motion of the Wobbler bars prevents the fines from sticking to them. No clogging is experienced in the Wobbler.

Here are on-the-job performance facts which speak for themselves. Increased production . . . no maintenance . . . no clogging even in wet, sticky material.

Universal's Wobbler Feeder works like this — Elliptical-shaped bars form the feeder bed and are set in alternate vertical and horizontal positions. Turning of the bars imparts a rocking, tumbling forward motion to the load. (See drawing above) Fines drop through bar spacings. Oversize is delivered off the end. Crusher capacity is increased because *only* oversize is delivered to it.

This is an ideal unit for increasing the capacity of primary or secondary crushers. Tell us the kind of material to be handled, the percentage of fines in the feed, size of fines to be removed and the desired capacity in tons per hour. We'll furnish complete information.

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EDITOR'S PAGE

ILLEGITIMUS NON CARBORUNDUM!*

IT'S HIGH TIME we did a little positive and optimistic thinking about this Sputnik situation, lest we be ground under the heel of despair. Pessimistic rumblings from Washington have been getting out of hand; they're upsetting our normal course of true progress.

You—our readers—are Americans as well as rock products producers. As such, you have a big stake in the outcome of this apparent "crisis." So we want to talk to you about it.

Since Russia hurled the first satellite around the globe, we've witnessed a situation bordering on mass hysteria that promises to affect adversely nearly every phase of our economic existence. How quickly attitudes changed after that historic event!

As soon as it happened, some officials in high government places cried aloud that we should be appalled at our backwardness in a missile program. "What's happened to our scientific superiority, and why have we sunk to lowest depths in national defense?," they shouted. "Who is to blame?," they wanted to know. The attitude of fear seemed to set in immediately, and now it's built up to a pretty high and dangerous point. Actually, our national pride was hurt, and many wanted it salved by putting someone on the hot seat.

As a result, we now hear that our annual defense budget has to be jumped $2-3 billions a year for several years, because we're sadly deficient in defense. Our whole system of education suddenly has become obsolete and ineffective, they say. The setup of our Defense Department is all cockeyed, we're told.

Factually, we fear that the raising of voices in criticism have too much overshadowed our real achievements in science. We simply don't know all the facts about this yet.

Of course it is important that we make proper progress in every phase of our defense effort. Maybe we have neglected a missile program. But, realization of that neglect should not be so reactionary as to cause us to lose our senses or to change our long-time calculated viewpoint on all phases of our economic existence.

A real danger exists at this writing, and we hope it will be nullified by the time this gets into print. The way things have been going, we could talk ourselves into economic catastrophe. This cannot be!

So—let's think and talk sensibly, realizing that we as a nation have the plus values that have made us a strong leader among all nations. Help to boost common faith in the principles that have made us great, lest we lose the continuity of thought toward progress that has kept us on top—a most important attitude toward success in our way of life.

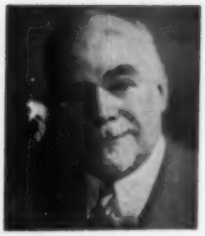
Realistically face a shortcoming if there is one. Then, set about to correct it in a practical, sensible way as is our progressive custom.

*—*Free translation: Don't let the wrongdoers grind you down!*

George C. Lindsay

ROCKY'S NOTES

NATHAN C. ROCKWOOD



Don't overlook rarer minerals

ROCK PRODUCTS PRODUCERS and processors constitute the most numerous of miners who delve into and exploit the mineral kingdom and their operations are the most dispersed of any. True, the minerals they mine are the commonest; hence there is little romance attached to their exploits. Nevertheless, they are in a position, in many instances, to discover the presence of some of the rarer mineral elements, which are constantly attracting more and more attention. Modern chemistry now includes many new processes for recovering and using these elements, that were little known, or known only as curiosities, but a very few years ago.

For example, we find in **Chemical and Engineering News** for November 11, an advertisement of the Michigan Chemical Corporation to supply enough for pilot plant processing of any of the following rare elements in oxides, or salts, or some in metal form: Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium, Lutetium, Yttbrium. How many of these have you ever heard of? Yet they are all derived from the earth's crust and have become commodities of commerce. They enter into the production or manufacture of new special weapons, electronics, alloys or cermets (ceramic products).

Let's see what a few of these are: Samarium (Sm) is No. 62 in the Periodic Table of Elements. Its atomic weight is about 150 (lead is 207) so it is about three-fourths of the weight of lead. It has also been found in certain shales. There is about 6½ grams per ton of Sm in most igneous rocks. Europium (Eu) is Element No. 63. There is about 1 gram in a ton of igneous rock. It is also found in some shales. Gadolinium is Element No. 64 (Gd). It is about as common in igneous rocks as Samarium (6½ grams per ton). Terbium is Element No. 65 (Tb) and there is less than 1 gram per ton of igneous rock. We will not go through the list since we merely want to show that this group of elements is rare only because they occur in such minute percentages; they are common in the sense that they are widespread over the earth's surface in certain kinds of igneous rock. They all belong to the rare earth group of elements and are usually associated together in the same kinds of rock or shale (which is derived primarily from such rocks).

There are other mineral elements much needed in present-day chemistry and metallurgy such as lithium, beryllium, boron, scandium, titanium, vanadium, gallium, germanium, and many others, which are likewise widely distributed, but usually in very small concentrations. Some of these, like boron and lithium, have been found in sufficient concentration in a few localities to satisfy all present needs. The point we wish to make is that there is hardly any element in the earth's rock crust that has not now some use and some value in today's chemistry and metallurgy. Moreover, that our country may be as self-sufficient as possible, it is desirable for all who delve into the earth's crust to be alert to the possibility of discovering such needed minerals.

There are very few published chemical analyses of rock sufficiently complete to be of much help. The search for these scarcer mineral elements is so recent that geochemists have not begun to discover all the possible sources. One may think that it is a job for geologists, mining engineers and professional prospectors only, but as in the case of some most valuable recent uranium deposits, discoveries have been made by amateur prospectors. Most of these discoveries, of course, have

Please turn to page 178

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Rock Jobs Profit from Bucyrus-Eries...Yours can too!

Loading out rock at a one million yd. cut near Elizabethtown, Ky., is this 3-yd. Bucyrus-Erie 71-B shovel equipped with torque converter drive. It is owned by Traylor Bros. Contracting Co., Evansville, Ind. The job — part of the Kentucky Turnpike project — furnished high-grade fill for other sections of the road.

Quality Limestone Co., Sussex, Wis., produces some 400,000 tons of limestone products a year. This material is sold as agricultural lime, crushed rock, and building stone. Early in 1955 this 2-yd. Bucyrus-Erie 51-B shovel was brought in to load stone at the company quarry.

On the 236-mile Kansas Turnpike about 6 million yards of rock were excavated — mostly in the Flint Hills and Topeka to Kansas City cuts. This ¾-yd. Bucyrus-Erie 22-B shovel, working near Topeka, loads out rock to be used as aggregate for a paving company. The machine is owned by Weaver Construction Co., Iowa Falls, Iowa.

At the base of Mt. Franklin near El Paso, Tex., this 38-B shovel loads rock for its owners, Standard Aggregates Co. of El Paso. The rock, blasted from the face of the mountain, is crushed at a processing plant for use in roadbuilding, asphalt mix, etc., This 38-B works at an altitude of 4,000 feet or more, where considerable dust and heat during the summer months make work difficult.

"This 38-B is giving very good service under hard work, and is most dependable," say the satisfied owners.

Hayes Quarries, Washington, Iowa, uses this Bucyrus-Erie 22-B shovel for two important jobs. Shown here loading rock at the company's "Grace Hill" quarry southwest of Washington, the machine also removes a 12 to 40-ft. layer of dirt and sandstone overburden.

The rock itself is St. Louis limestone (92% calcium content), used for road stone and concrete.

Before this machine was put on the job early in 1955, another 22-B shovel had loaded rock at the quarry for 5½ years. The owner reports there were no major breakdowns and that the machine was economical to operate.

For complete information on any Bucyrus-Erie convertible shovel from ⅜ to 4-cu. yd., contact your nearby Bucyrus-Erie distributor. He'll show you how a Bucyrus-Erie's special combination of features can make your work more profitable. Bucyrus-Erie Company, South Milwaukee, Wisconsin. 331E57C

BUCYRUS ERIE

A Familiar Sign at Scenes of Progress

Here's how to dig profits out of a quarry

Swiftly and surely it bites into the limestone. Up goes the bucket, full at first pass. The operator turns the Caterpillar No. 977 Traxcavator easily, effortlessly. The approach to the truck, a smooth dump, then back.

Look at the No. 977 in these three pictures. That's performance! It loads trucks for the Whitestone Lime Co., Leander, Texas, in 2½ to 4 minutes, keeps loading them 9 hours a day, 7 days a week. This speed, capacity and dependability help put the profit into a quarry operation.

No other machine can do so many jobs so efficiently as a CAT Diesel Traxcavator. Equipped with quick-change attachments, this all-purpose tool handles chore after chore. You can always keep it busy.

Besides the No. 977 (2¼ cu. yd.), there are two other Traxcavators: the No. 955 (1½ cu. yd.) and the No. 933 (1 cu. yd.). All are available in the new Series E . . . specifically engineered for greater economy on rock jobs. They feature heavier idlers; solid sprockets; tougher track rollers with frames and guards of heavier construction; more ground clearance; lower center of gravity for better handling and stability; lower transmission speeds for more bucking power.

Your Caterpillar Dealer stands ready with round-the-clock service and parts you can trust. Tell him to show you—*on your job*—the Traxcavator that will pay off best.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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WANTED—
THE HARD WORK

Washington Letter

Edgar Poe

Review of Depletion Allowances

Opponents of the tax depletion allowances accorded to the speculative oil and natural gas industry are expected to use a decision of the Supreme Court of the United States when the House Ways and Means Committee takes up the question of reducing the allowances.

The Supreme Court, in refusing to review a lower court decision, ruled that depletion allowances for brick and tile could be used to offset income from manufacturing and processing operations connected with their production, and are not alone limited to mining. Some government tax authorities contend that the ruling by the tribunal will result in more than $113 million in tax refund claims, plus an annual loss in revenue of $8.5 million.

The House Ways and Means Committee has scheduled a review of depletion allowances.

Legislation Affecting Building

Building of public school classrooms rose to $2.8 billion in 1957, but 1958 is expected to show an even greater increase than the 69,200 new public school classrooms provided in the 1956-57 school year. A new effort will be made in Congress to revive the proposed huge Federal-aid school plan which the House of Representatives side-tracked last year. However, chances are slim for the pending measure to become law at this session.

Sewage and water facilities reached a peak of $1.3 billion, a five percent increase the past year. There was a drop of nine percent in military construction. There is likelihood that military construction will show no increase the coming year despite the tremendous expenditures by the Department of Defense.

Housing construction probably will show a slight increase. Congress appears certain of passage of housing legislation during the session. The lawmakers have passed legislation to aid home construction each year since 1945. The industry has come to count on annual legislation. There is expected to be a decline in commercial construction such as large shopping centers, but this probably will be offset by an increase in the construction of office buildings and warehouses. The high levels of activity in the nonresidential categories such as churches, educational, social and recreational facilities are expected to be maintained. A moderate increase is expected in hospital and institutional building.

Construction Outlook

Construction in 1957 smashed dollar volume records for the 12th consecutive year with a grand total of $65 billion. The Associated General Contractors of America says that the 1958 potential market may reach $68 billion. The AGC, representing 7,000 construction firms, bases its 1958 estimates on assumptions including:

Plant and equipment expenditures by business will not drop more than 10 percent, any general business decline will be mild and short-lived, credit conditions will improve, materials will be plentiful, there will be no prolonged major work stoppages nor curtailment of federal construction programs, and international conditions will not worsen.

Production Estimates

Production of gypsum and gypsum products in 1957 was lower than 1956 due to the decline in the number of housing units. There was a decrease of about 14 percent in quantity of domestic crude gypsum mined during the year. Imports also dropped. Several new plants launched operations.

The output of stone and sand and gravel in 1957 is estimated to have increased approximately six percent over the previous year. Use of aggregates in actual construction was growing. Among factors that tended to limit the increase in 1957

were the decline in new housing and the cement strike.

A five percent decrease in total clay production was registered, compared with 1956. There was an over-all lag in construction using heavy clay products. Phosphate rock production was less than in 1956 when producers were rebuilding depleted stocks. However, total phosphate rock sales remained about the same as in the previous year. A new phosphate-rock field was reported in Beaufort County, N.C., as explorations continued in other areas.

Travel Tabulated

Travel on all roads and streets increased 28 percent during the 1951-56 period, the Bureau of Public Roads says in a newly tabulated report. The report is of marked significance to the highway industry because it discloses trends. The five-year study showed that 31 percent of the travel took place in rural areas as compared with 24 percent in urban areas. The growth of passenger car travel exceeded all other types of vehicles as evidenced by increases of 29, 22 and 12 percent for passenger cars, trucks and buses, respectively.

Daily travel on the main rural roads totaled 650 million vehicle miles in 1956 as compared with 625 million in 1955, or an increase of four percent. Passenger car and bus travel on main rural roads increased 26 percent from 1951 through 1956, single truck travel, 22 percent and truck combinations, 27 percent.

A billion More for Highways

The highway construction program in 1958, barring some national calamity, will be the greatest in history. The federal government estimates an outlay totaling $5.6 billion compared with $4.6 billion in 1957.

While a record road-building program is shaping up, the potential market for all construction activity in 1958 is estimated at $68 billion, or $3 billion more than 1957. Authorities in the nation's capital say the over-all picture, despite some soft spots in scattered sections, looks favorable.

The industry is expected to have a marked effect on the nation's economy. While the economy generally is expected to dip the first quarter of this year, the building industry will show a rise. Construction is the biggest employer of labor.

The increased road activity will aid many highway contractors in all parts of the country who have had little or no work since the greatest public works program in history started in the summer of 1956. There are some 6,000 highway builders in this country. However, many of the small operators have been unable to bid on the million-dollar-plus interstate projects because of the lack of capital, equipment, etc. More half-million and quarter-million dollar projects and less appear likely in 1958.

Both private and government authorities in the nation's capital agree that while some barriers, including increased costs, loom on the horizon, the highway industry generally can look ahead with optimism not only this year but for the next 12 or 15 years. Predictions are that the annual outlays for local, state and federal highways will go up to at least $8 billion and possibly $9 billion a year during the peak years.

Inquiry Retards Strikes

The hearings conducted by Sen. John L. McClellan of Arkansas and his special Senate committee inquiring into the misdeeds of labor and management probably have had a wholesome effect. Some of the labor chieftains were too busy getting their own houses in order to lead strikes or threats of strikes. Leaders realized that strikes on top of some of the dramatic misdeeds on the part of a few of the bigwigs would have been bad public relations.

As a result there was less time lost and fewer workers idled because of strikes in any year since the Japanese surrendered. The number of new strikes declined from 3,825 in 1956 to an estimated 3,600. The workers involved in these strikes dropped from 1,900,000 in 1956 to 1,400,000 in 1957.

One of the major strikes was the work stoppage in the cement industry in 21 states starting May 15. Approximately 16,000 workers were idled. One-year agreements with the United Cement, Lime and Gypsum Workers International Union provides generally for hourly wage increases averaging 13.6 cents, of which 10 cents was retroactive to May 1, 1957; increase in shift differentials; time and one-tenth for Sunday work; liberalized vacation benefits for long service and double time for more than 12 hr. consecutive work.

Primarily because of the cement strike and strikes in the building trades on the West Coast, 1957 production declined about seven percent from 1956. However, Government economists assert that although a few cement plants were temporarily closed at the start of the New Year, the industry continues to look forward to expanding demand for highway and other construction.

END

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If you specify "Allis-Chalmers motors or equal"

. . . remember that the "equal" is possible only in two respects: price and nameplate specifications. You can't match the *long-run power* of Allis-Chalmers motors.

Double-shielded bearings guarded against dirt and over-greasing . . . provision for elimination of moisture condensation . . . practically indestructible rotor design . . . more cooling surface . . . more iron and copper content — these are the features (with others) that make up long-run power. These are the features that give Allis-Chalmers motors "plus" performance that can't be equalled.

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21.5 mph Cruiser® — One man controls all operations, one engine supplies all power for work and travel on Koehring 205 Cruiser crane. There's a full range of low working speeds up to 7 mph — plus travel speeds up to 21.5 mph. It has smooth torque-converter drive, power steering, 27½-foot turn radius, 30% gradability. Usefulness is unlimited in mines, pits, and quarries. 205 Cruiser lifts up to 15 tons — handles ½ to ¾-yard clamshell or dragline buckets on a wide work radius — converts to ½-yard shovel or hoe.

Swings a big bucket — Notice the size of this dragline, stripping a coal seam in an Eastern mine (below). It's the big Koehring 1205 — and handles 3 to 4-yard bucket, depending on weight of materials. Boom lengths: 60 to 170 feet. This big-capacity stripper also converts to 3-yard shovel. High-lift model has a 3-yard dipper on 40-foot shovel boom — or a 2½-yard dipper on 50-foot shovel boom.

Ship to shore — A pair of Koehring 405 clamshell cranes, mounted on a Great Lakes dredge — one of the world's largest — solved the problem of transferring sand from the ship's hold to shore. With this system, approximately 4,500 tons of sand are unloaded in 6 hours. Crane in foreground dumps into a Johnson Lo-Bin, mounted on flanged wheels. Lo-Bin travels along track, transports sand to a swinging, boom-type conveyor, which stockpiles it at dockside. On clamshell work, Koehring 405 handles 1 to 1½-yd. buckets. Check its other capacities in chart on opposite page.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? See Koehring distributor.

In heavy rock — Owner of this Southern mine needed a heavy-duty shovel to strip rocky overburden — picked a Koehring ¾-yard 305 for the job. Its powerful digging crowd, and rugged strength of deep-section boom and dual dipper sticks, proved more than a match for the heavy rock. Yet, in work like this, 90% power-assist on main drum clutches gives operator a light lever-pull and sensitive "feel" of load. Power, strength, stability as a shovel increase the 305's work capacity with all attachments. For proof, check its lift ratings (at left).

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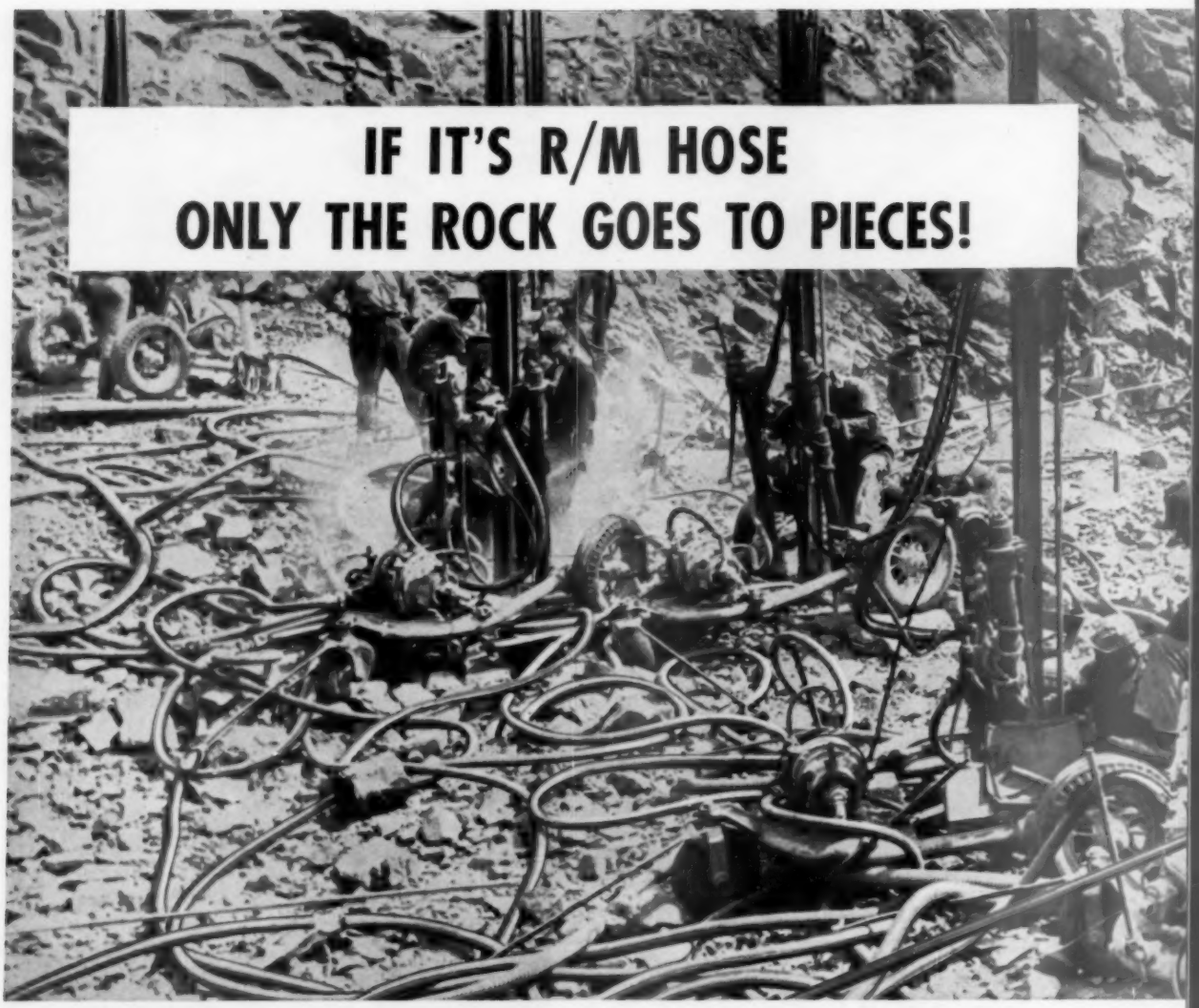

Long Life features of HOMOFLEX HOSE Assure

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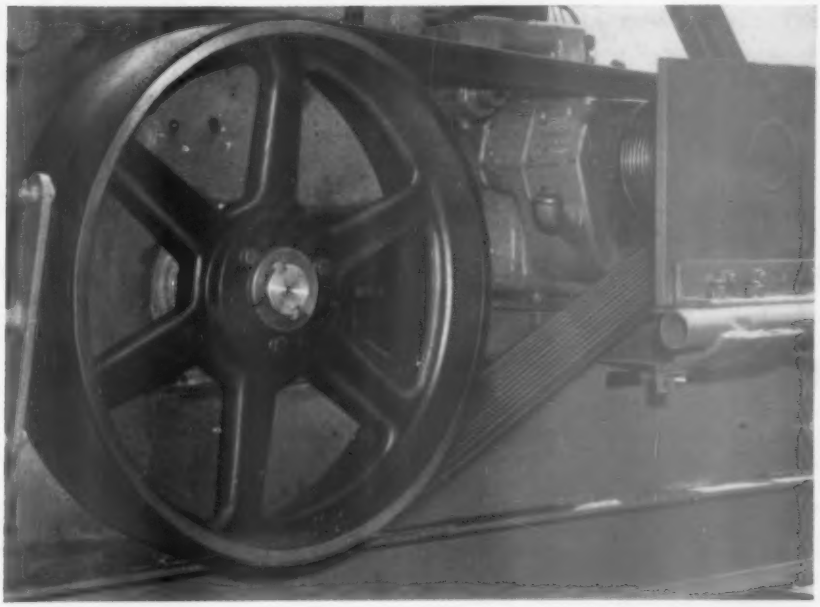
Rugged Homoflex Hose is R/M's exclusive construction for use with air, water, other fluids and gases. Strong enough to stand up under the toughest conditions, yet light in weight and flexible as a rope for easier handling . . . even on the roughest, rockiest job site. Exclusive R/M features make Homoflex Hose do a *better* job . . . and *last longer.*

- Mandrel-Made — No Pre-Set Twist, Extremely Flexible
- Inseparable Cover, Strength Member and Tube
- Coils and Uncoils Freely in *Any* Direction, Resists Kinking
- Balanced Homogeneous Construction Throughout
- Uniform Inside and Outside Diameters — Easier Coupling
- Withstands High Pressures and Surges with Wide Margin of Safety

R/M has a hose construction engineered to meet *every* job requirement. Write for Bulletin #6879.

RAY-MAN CONVEYOR BELT — Tough, flexible Ray-Man resists gouging and tearing. Double compensation relieves stress on outer belt plies . . . assures longer belt life and lower cost. High fastener holding ability. Other types available for every bulk materials handling requirement. Write for Bulletins.

R/M POLY-V® DRIVE — New, patented heavy duty drive delivers up to 50% more power in the same space as conventional multiple V-drive . . . equal power in as little as ⅔ the space. Single unit V-ribbed belt design eliminates multiple-belt "length matching" problems. More constant speed ratios, less wear on belt and sheaves, smoother running. Write for Bulletin #6638.



Inseparable Cover, Strength Member and Tube
Balanced Homogeneous Construction Throughout
Coils and Uncoils Freely in Any Direction, Resists Kinking

*Poly-V is a registered Raybestos-Manhattan Trademark.

RM 802

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How would you decide?

A roundup of actual day-to-day in-plant problems and how they were handled by management men

Does time out on strike count towards eligibility for wage increases?

What Happened:

THE COMPANY'S AGREEMENT called for a 5¢ wage increase after three months of employment and additional 5¢ automatic increases every three months thereafter until the maximum rate for the job was reached after 12 months of employment. At contract renewal time, a strike took place when the company and union could not agree on new terms. Thirty days later the employes went back to work under a new agreement which called for a renewal of all the terms of the old contract and provided for an across-the-board wage increase. The settlement stipulation also contained the usual language that no punitive action would be taken against the strikers. Subsequently, when the company computed the automatic increases, it did not take into account the 30 days spent on strike. The employes affected protested against the delay in their increases and brought the case to arbitration. Here the company justified its action on the following grounds:

1. The term "three months of employment" must be interpreted to mean three months of actual service.
2. During the strike no agreement existed and thus there was no obligation during that period to pay these increases.
3. Automatic wage increases are intended to compensate employes for increased skills acquired during actual employment.

The union replied:

1. To deprive the employes of this time is to impose a penalty for striking and that is contrary to settlement agreement terms.
2. The strikers remained employes while they were out on strike, and the strike was part of the period when seniority accrued.
3. The agreement calls for reaching the maximum in 12 months, and the company is increasing the time to 13 months by its action.

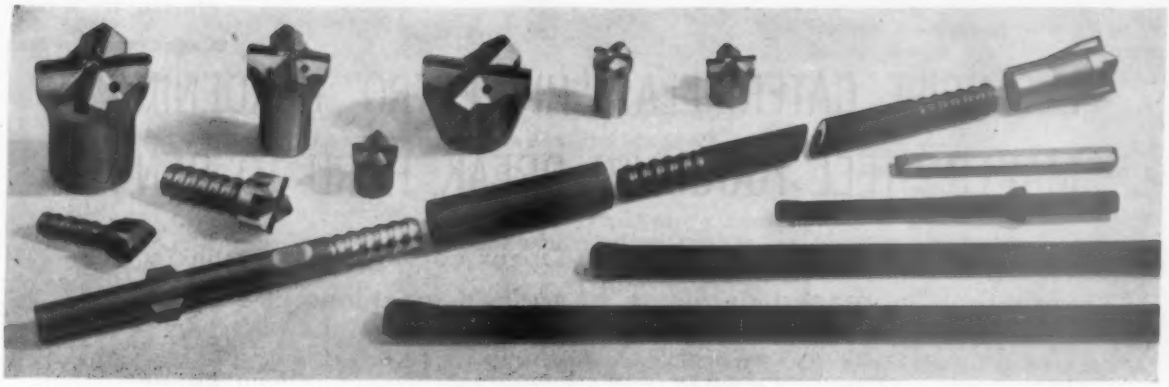
Was the company:
Right? ☐ Wrong? ☐

What Arbitrator Cahn ruled:

"Automatic increases are generally granted to enable an employe to periodically receive an increase and reach a set rate after a given period of time. They differ from merit increases which generally are considered compensation for increased ability and skill. Merit increases are not given automatically or with any degree of regularity but only upon the showing of merit. Automatic increases do not depend upon the acquisition of skill or ability but only upon acquiring seniority. Even if an employe does not increase his skill, if he is retained for the required period of time he gets his automatic increases. No provision was made in the settlement agreement to deduct seniority for the time on strike. On the contrary the company specifically agreed not to levy any penalties against the strikers. Time on strike will be counted toward required time for automatic progression increases."

(Continued on page 31)

Each incident given in this department is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to *Rock Products*.



SANDVIK COROMANT—

A Complete Range of Drill Steel Equipment

You know as well as we do the advantages of buying all your drilling equipment from one supplier. These advantages become still more evident if you buy from the Sandvik Range. The Sandvik Steel Works are the world's largest manufacturers of tungsten carbide for rock drilling. Their production covers integral steels, detachable bits, extension steels and stone working tools—all made of high-quality Swedish alloy steel, all fitted with the well-known Coromant tungsten carbide inserts.

Integral steels with 50% longer life

Sandvik Coromant integral steels have up to 50% longer rod life than ordinary steels, thanks to anti-corrosion SR-treatment, which protects them during transport, storage and actual drilling. In addition, air-tight plastic caps give bit and shank extra protection during transport and storage. They are available in these standard sizes:—

$\frac{3}{4}''$ hollow hexagon	1′4″-13′1″
$\frac{7}{8}''$ hollow hexagon	1′4″-21′0″
1″ hollow hexagon	2′6″-21′0″
Flexible drill steels	2′7″-31′6″

Precision-made rock bits

The threads of Sandvik Coromant (cross and X-design) bits are precision milled. The bits are so accurately manufactured that not only smoother drilling but *longer life* are ensured. Standard bit diameter sizes range from $1\frac{1}{2}''$ to $4\frac{1}{2}''$. The 773 bits (bottoming type) are available with GD400 and GD600 thread, or with $1\frac{1}{4}''$, $1\frac{1}{2}''$ and 2″ rope thread. The 776 bits, for standard shoulder-type drill rods, are available with threads ranging from $\frac{7}{8}''$ to $1\frac{11}{16}''$.

Efficient extension steels

The rope-threaded joints of Sandvik Coromant extension steels are solid and make joining and unscrewing extremely easy. Sizes available: $\frac{7}{8}''$ and 1″ hexagon steels, $1\frac{1}{4}''$ and 2″ round steels. A special feature of the $1\frac{1}{4}''$ equipment is the $\frac{1}{2}''$ flushing hole, about twice as large as most. This gives better cleaning of the bore hole and a higher rate of advance, reduces wear and risk of steels sticking. The 'cold rolling' technique makes this wider flushing hole possible *without any loss of strength.*

Wide variety of Stone Working Tools

A single plug hole steel made by Sandvik is capable of drilling up to 1000 holes, each about 3.9″. Sandvik Chisel Steels are made with rubber sleeves to reduce vibration and protect the worker. Sizes available: Plug Hole Drill Steels with bit diameters ranging from approx. $\frac{21}{32}''$ to $\frac{7}{8}''$. Chisel steels with bit diameters from approx. $\frac{5}{16}''$ to $\frac{25}{32}''$.

The World's foremost drilling unit

Sandvik Coromant extension and drill steels have been developed in close co-operation with Atlas Copco, manufacturers of rock drills and other compressed air equipment. The combination of Sandvik steels and Atlas Copco rock drills is the world's most widely used drilling unit—responsible for the drilling of more than one thousand million feet each year!

Write, phone or cable today for further details to any of the addresses below:

Atlas Copco

EASTERN *P.O. Box 2568 Paterson 25, N.J.* **PACIFIC** *930 Brittan Av, San Carlos, Calif.*

CANADA *Montreal Airport, Quebec.* **MEXICO** *Apartado Postal 56, Torreon, Coahuila.*

D1577A

Enter 1130 on Reader Card

EXCLUSIVE CATERPILLAR "HI-ELECTRO" HARDENING MAKES STEEL TOUGH TO BREAK, HARD TO BEND

Result: New CAT Scraper and 'Dozer cutting edges, built to withstand increased demands of today's machines, are top buy.

The cutting edge of a bulldozer or scraper takes more punishment than any other part of the machine. And more punishment today than ever before. New, larger, more powerful machines make greater demands on cutting edges.

New Caterpillar cutting edges match the superb quality and performance of Caterpillar earthmoving equipment. They are built to stay on the most grueling jobs, day after day, without breaking or bending. There is no better buy at any price.

Field tests prove that the new Cat cutting edges not only outwear other make edges of the same thickness; they even outlast the thicker edges of other manufacturers.

To manufacture such tough edges, Caterpillar engineers perfected a hardening process to give steel the right blend of toughness and hardness—toughness to prevent breaking, hardness to prevent bending and rapid wear.

ROUGH JOBS like this put cutting edges to severe test. And here is where tough Caterpillar edges prove their superiority.

A quality edge starts with quality steel, tested in Caterpillar's laboratories for the right chemical composition and physical characteristics. Only steels meeting these exact specifications are accepted, and further tests are made at every stage of production.

Edges are heat treated by "Hi-Electro" hardening, a Caterpillar exclusive. This gives a deep, superhard wear case. The core is left tough. The finished edge has an armor-like case and a shock-absorbing core.

Your Caterpillar Dealer has full information about the new Cat Scraper and 'Dozer cutting edges. See him today.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CROSS SECTION of edge showing armor-like case and its shock-absorbing core.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

"HI-ELECTRO" hardening machines at the Caterpillar factory give cutting edges the strength to resist breaking and bending.

Labor Relations

continued from page 28

Must you rehire an employe who spent his leave in a mental hospital?

What Happened:

X'S ATTENDANCE RECORD started getting bad. His foreman questioned him about his repeated absences and tried to find out what was wrong. X had 10 year's service with the company and until recently his record was excellent. He told the foreman he wasn't feeling like himself and thought he should take a leave of absence to try to straighten out. A three-month leave was arranged. A few weeks later, the company got word that X had been committed to a mental institution. An inquiry from their medical department revealed that extended care was probably in order. At that point, the company took his name off the seniority list. About two months later X appeared at the plant and requested reemployment. His discharge papers from the institution read, ". . . although on probation, this patient would be quite able to do his work." The company decided not to re-employ him. X filed a grievance and argued:

1. He had 10 years of service during which he functioned capably.
2. The hospital was going to give him a complete discharge shortly—as soon as it was determined that he could hold a job on the outside.
3. He had been confined to a mental institution before first coming to work for this company, and that confinement hadn't affected his ability to do the work for 10 years.

The company answered:

1. Our medical department claims that X's mental illness is of a recurrent nature.
2. He has not been discharged as cured—he is only out on trial.
3. We do not have positive assurance that to re-employ him might not constitute a risk to his fellow employes.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Vokoun ruled:

"I would sustain the company in its determination not to re-employ X if it had been shown that there was evidence available to indicate that his reemployment might constitute a safety hazard or that his attendance would continue to be so sporadic that he could not be depended upon to do his job. Confinement to a mental institution by itself is not just cause for discharge. We have a history of 10 years of excellent service to the company after his last confinement, as well as the statement from the doctors who attended him that he is capable of doing his work. Part of his rehabilitation appears to depend on being gainfully employed, and if he meets that test he will be completely discharged from the institution. For those reasons, the company is directed to reinstate him."

When can't you fire a worker for excessive carelessness?

What Happened:

JACK KEEN had worked for the company for four years. During his fourth year on the job he made a great many errors, serious enough to mislead the company in some of its decisions. So he was fired for incompetence and carelessness. The company claimed that:

1. Keen made far too many mistakes to be overlooked. His errors damaged our relations with suppliers, and cost us time and money to correct.
2. His careless attitude is clear from his frequent lateness and absence during the past year.
3. Accuracy is vital in that job, and Keen knew this when he took it on.

But Keen objected:

1. My working conditions and the company's methods were such that I didn't have enough control over my own work to do it accurately. I couldn't help it.
2. My absence and lateness during the past year were due to the fact that my young son was seriously ill, which the company knew. The company even encouraged me to take time off because of it, so they have no right to use that against me now.

Was the worker:
Right? ☐ **Wrong?** ☐

What Arbitrator Spencer Pollard ruled:

"It is the conclusion of the arbitrator that there is insufficient evidence to warrant writing 'incompetent and careless' upon Mr. Keen's record, in view of the conditions of work granted him by the company. The mistakes which brought on this case may have been made by Mr. Keen, but we cannot be sure of that in view of the loopholes and informalities in the company's system. Since the burden of proof is on the company, as the party making the charges, it appears that a reasonable doubt has been established as to Mr. Keen's part in the errors. There is, therefore, insufficient evidence to penalize Mr. Keen for them. There is nothing in the record to show that the company objected to Mr. Keen's tardiness or absences, while they were occurring intermittently over a whole year before his discharge. The evidence is that the company had decided to help him in that way with his family problem. The Arbitrator believes that it is now too late for the company to decide to penalize him for this. Mr. Keen should be reinstated in his job and compensated for lost earnings."

END

PEOPLE

IN THE NEWS

Successor named to Standard Portland chief chemist

James K. Sebring

Louis C. Creveling

LOUIS C. CREVELING has retired as chief chemist of the Standard Portland Cement plant, Painesville, Ohio, of Diamond Alkali Co., Cleveland, Ohio, which he has held for the past 33 years. He will be succeeded by James K. Sebring, chemist at the plant since 1955.

Mr. Creveling, a native of Easton, Penn., and a graduate of Lafayette College in Easton, will continue to work with the company in a special consulting capacity, devoting his time to special assignments connected with new product development. During his association with the Standard Portland Cement plant, Mr. Creveling has been an active member of the general technical committee of the Portland Cement Association.

Mr. Sebring, a veteran of 11 years of service with Diamond Alkali Co., joined the company in 1946 as a chemist following two years as chief chemist at Speer Carbon Co., St. Marys, Pa. He was born in Brookville, Pa., and was graduated from Allegheny College, Meadville. He was supervisor of the main plant laboratory at Painesville for three years prior to his transfer to the Standard Portland Cement plant.

Cox named vice president

B. FRANKLIN COX has been appointed vice president of Ocean Cement & Supplies Ltd. and British Columbia Cement Co. Ltd., Victoria, B.C. He was also named general manager of the British Columbia Cement Co. to succeed Nigel Tomlin, who has retired. Mr. Cox has been associated for 28 years with the Associated Portland Cement Manufacturers Ltd. in Great Britain, the last 12 of which he served as manager of the company's plants in Scotland.

Carl F. Clausen honored

CARL F. CLAUSEN, director of the manufacturing process department of the Portland Cement Association, Chicago, Ill., received a membership award from the American Institute of Mining, Metallurgical and Petroleum Engineers at a recent meeting in Chicago, for his participation in an AIME membership drive in the cement industry. A number of engineers, operators and officials in the cement industry have joined the Institute, which is giving increased attention to scientific and technical aspects of cement manufacture.

NMA vice president

V. P. JIMINEZ, senior plant engineer of the Birmingham Slag Co., Birmingham, Ala., has been elected zone vice president of the National Management Association, Dayton, Ohio. He will serve as a member of the NMA executive committee and will direct activities of the 45 directors and 45 affiliated clubs in Kentucky, North and South Carolina, Georgia, Florida, Tennessee, Mississippi, Alabama and Puerto Rico.

Sales manager

LEO F. MORGAN has been named sales manager of Idaho Portland Cement Co., Spokane, Wash. He succeeds E. A. Dufford, who has retired but retains the positions of director and vice president of the company.

SME president for 1959

J. W. WOOMER has been nominated president-elect of the Society of Mining Engineers, AIME, for 1958. If elected as president-elect, Mr. Woomer, who heads the consulting firm of J. W. Woomer & Associates, will become president of SME in 1959. Born in Phillipsburg, Pa., Mr. Woomer received B.S. and E.M. degrees from Pennsylvania State University. His consulting activities have taken him to many parts of the world, much of his work being with potash, oil sands, shales, lignite, clays, copper, uranium and iron. Mr. Woomer is also a director of the Engineering Society of Western Pennsylvania.

General purchasing agent

CLYDE K. JORALEMON has been appointed general purchasing agent of North American Cement Corp., New York, N.Y. He succeeds Albert R. Couchman, assistant to the operating vice president and general purchasing agent, who passed away December 9.

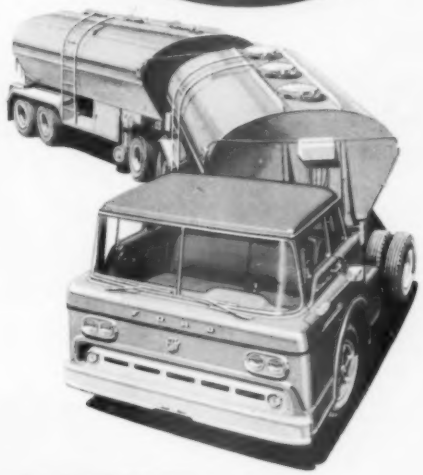
Assistant to president

LOY C. MONTGOMERY has been appointed assistant to the president of the Janesville Sand and Gravel Co., Janesville, Wis., according to an announcement by Ellis E. Jensen, president. He was formerly executive vice president and general manager of the Fifield Lumber Co., Janesville, Wis. He is a graduate of Franklin College of Indiana, and holds a master's degree from Marquette University.

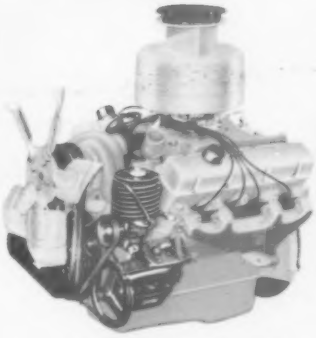
(Continued on page 57)

FORD

1958 EXTRA HEAVY DUTY TRUCKS
WITH NEW SUPER DUTY V-8'S

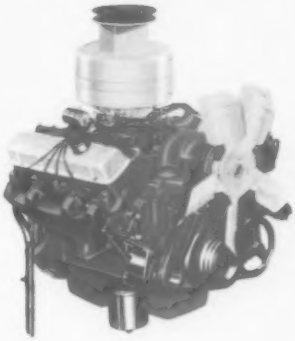


C-850
C-950
C-1000
C-1100



277-hp 534 SD V-8

F-850
F-950
F-1000
F-1100



260-hp 477 SD V-8

T-850
T-950

226-hp 401 SD V-8

BIG TRUCK BUILT...BIG TRUCK POWERED...AT FORD'S LOW PRICES!

FORD TRUCKS COST LESS

...LESS TO OWN *...LESS TO RUN* *...LAST LONGER, TOO!*

NEW FORD EXTRA HEAVIES

FORD T-950 tandem dump truck with up to 51,000-lb. GVW, up to 277-hp Super Duty V-8 available. GCW 75,000 lb.

FORD C-1000 Tilt Cab tractor with big 260-hp Super Duty V-8 engine. Maximum GCW 65,000 lb. with optional axle, GVW 31,000 lb.

FORD F-1100 conventional with 277-hp Super Duty V-8 standard. Maximum GVW 36,000 lb. with optional 29,000-lb. rear axle.

Step in . . . the new Ford Extra Heavy Duty trucks for '58—the all-new, more rugged line with huge payload capacities for on-highway or off-the-road service. *Step ahead* with Ford's more-for-your-money features. Meet America's most modern *big* trucks for '58. Discover the new advances in this pace-setting Extra Heavy Duty line of Conventionals, Tilt Cabs and Tandems.

They're new in power, too! Ford now offers three mighty new Super Duty V-8's. Extra rugged, modern big engines with up to 534-cubic inch displacement . . . up to 277 horsepower! And "over square" (bore larger than stroke) Short Stroke design provides maximum power, durability and economy.

Saddle-type, step-type and cylindrical fuel tanks are available, complete with electric fuel pumps for extra dependability. Mighty Super Duty engines and Ford Extra Heavy Duty chassis form a combination of power and ruggedness that can't be beat. Springs, axles, brakes—all components are engineered to give exceptional service. All the new Ford advancements for '58 mean *Ford Trucks Cost Less* . . . less to own . . . less to run . . . last longer, too!

QUICK FACTS

CONVENTIONAL MODELS	ENGINE		REAR AXLE		MAX. TIRES	GVW'S (lb.)		GCW'S (lb.)	
	Standard	Optional	Standard	Optional		Standard	Optional	Standard	Optional
F-1100	277-hp 534 V-8		22,000 lb.	29,000 lb.*	12 x 24.5—12 PR	30,000	36,000	65,000	
F-1000	260-hp 477 V-8		21,000 lb.	22,000 lb.	12 x 24.5—12 PR	30,000		55,000	65,000
F-950	226-hp 401 V-8		21,000 lb.		12 x 24.5—12 PR	29,000		55,000	
F-850	226-hp 401 V-8		18,000 lb.		11 x 22.5—12 PR	25,000		50,000	
TILT CAB MODELS									
C-1100	277-hp 534 V-8		22,000 lb.	29,000 lb.**	12 x 24.5—12 PR	31,000	36,000	65,000	
C-1000	260-hp 477 V-8		21,000 lb.	22,000 lb.	12 x 24.5—12 PR	31,000		55,000	65,000
C-950	226-hp 401 V-8		21,000 lb.		12 x 24.5—12 PR	30,000		55,000	
C-850	226-hp 401 V-8		18,000 lb.		11 x 22.5—12 PR	26,000		50,000	
TANDEM MODELS									
T-950	226-hp 401 V-8	260-hp 477 V-8 277-hp 534 V-8	38,000 lb.		12 x 24.5—12 PR	46,000	48,000 51,000	75,000	
T-850	226-hp 401 V-8	260-hp 477 V-8 277-hp 534 V-8	34,000 lb.	28,000 lb.	11 x 22.5—12 PR	43,000	37,000 45,000	— 70,000	55,000 —

*Not available on 132" wb. model.

**Not available on 99" wb. model.

Now from FORD . . . durable

Big, modern all-truck engines! Up to 534-cu. in. Displacement . . . 277 Horsepower for New Ford Extra Heavy Duty Models

New Ford Super Duty V-8's have up to 534-cubic inch displacements . . . up to 277 horsepower for rugged performance. Three great new "over square" (bore larger than stroke) Short Stroke V-8 truck engines for new Ford Extra Heavy Duty models. The most modern, most efficient gasoline engines in their field. They're ultra-modern . . . designed for today's hauling needs.

Engineered to develop more horsepower per pound, with rugged new durability features for longer-lasting dependability. And for routine maintenance their clean, simple design gives maximum accessibility for servicing. Powerful new Ford Super Duty V-8's have been thoroughly road tested by leading truck fleets, coast to coast . . . they're ready to bring you new power, durability and economy!

New internally mounted oil cooler helps keep oil film-strength greater for reduced engine wear, increased bearing life

New stress-relieved cylinder heads—neutralize normal stresses for longer engine life. Perpendicular machined to close tolerances—give tighter seal

New intake and exhaust valves and seat inserts are hard-faced for maximum wear resistance

New in-block wedge-type, fully machined combustion chambers give controlled compression, balanced power from each cylinder

New intake manifold — water-jacketed for stabilized temperatures . . . aids high horsepower and torque output, improves engine economy

New spark plug accessibility — 18-mm. plugs with "Turbo Action" resist fouling, give positive spark action

New alternately spaced sodium-cooled exhaust valves reduce hot-spot dangers, last longer

New externally balanced, forged-steel crankshaft equalizes bearing loads for greater durability, longer bearing life

New Turbulence-Top pistons for maximum power, top ring groove carrier for extended groove life and thermal-controlled integral strut for better piston sizing

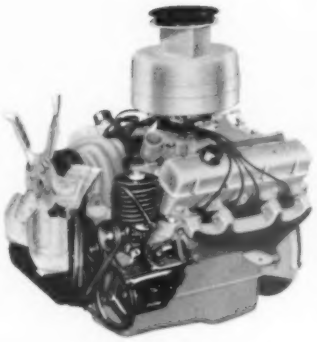
New, stronger "pyramid" connecting rods—hollow-milled for better balance

New extra-large Full-Flow oil filter — big 2-quart capacity for double filtering area

New high-capacity rotor-type oil pump mounted within the oil pan for more efficient lubrication system

FOR INDUSTRIAL ENGINE APPLICATION WRITE TO: INDUSTRIAL ENGINE DEPARTMENT, FORD DIVISION OF FORD MOTOR CO., P. O. BOX 598 DEARBORN, MICHIGAN

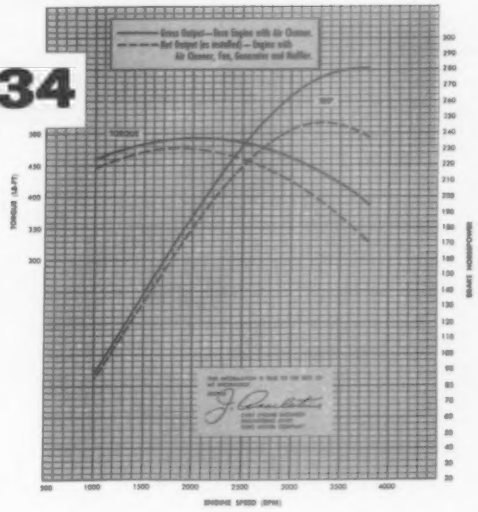
new Super Duty power



277-hp 534 SD V-8
Brake Horsepower—277 @ 3400 rpm
Torque—490 lbs-ft @ 1800-2300 rpm
Bore—4.50 in. **Stroke**—4.20 in.

534

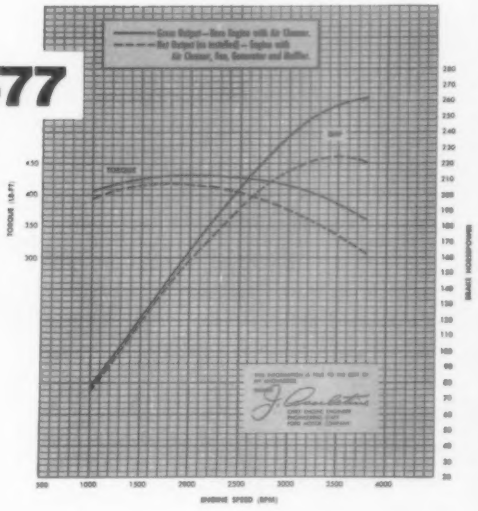
The big, new Ford 534 is an "over square" Short Stroke engine, like all Ford Super Duty V-8's. Here's snappy power, long-lasting durability and top economy. Standard in Ford F-1100, C-1100 trucks. Optional in T-850, T-950 tandems.

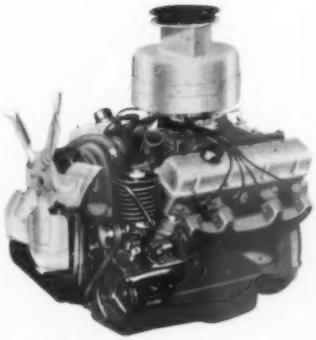


260-hp 477 SD V-8
Brake Horsepower—260 @ 3600 rpm
Torque—430 lbs-ft @ 1800-2300 rpm
Bore—4.50 in. **Stroke**—3.75 in.

477

Now . . . 477 cubic inches of super power for your Extra Heavy Duty needs! Notice the high and flat torque curve (power curve at right) to insure maximum performance. Standard engine in Ford F-1000, C-1000 trucks. Optional T-850, T-950 tandem models.

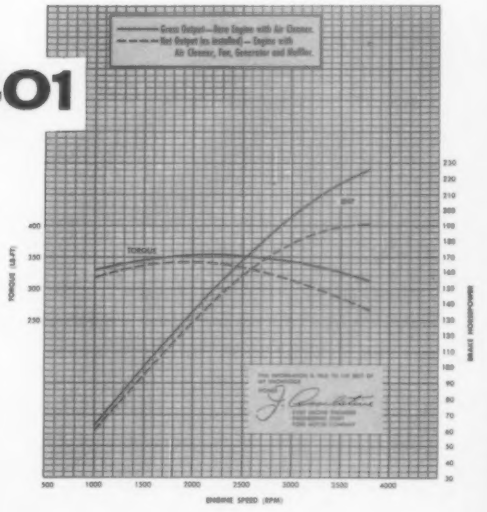




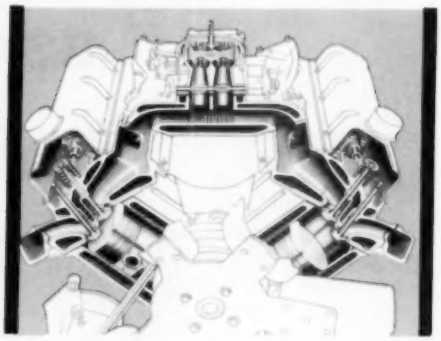
226-hp 401 SD V-8
Brake Horsepower—226 @ 3800 rpm
Torque—350 lbs-ft @ 1800-2300 rpm
Bore—4.12 in. **Stroke**—3.75 in.

401

For higher earnings every trip, Ford Super Duty V-8's like this popular 401-cubic inch engine provide the best horsepower to weight ratios obtainable in comparable all-truck engines today. Standard in Ford F-, C- & T-850 and 950 models.

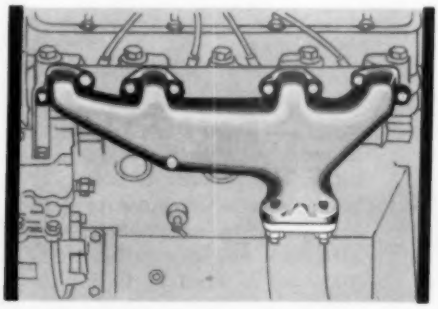


Outstanding new FORD V-8



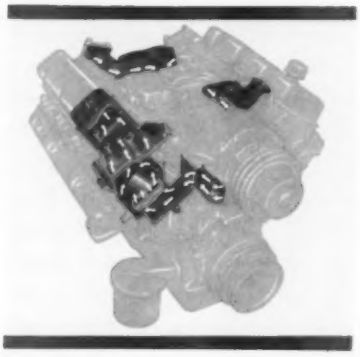
NEW INTAKE MANIFOLDING—Much of the exceptional performance of Ford's new Super Duty V-8's can be traced to their free-breathing design. Thermostatically controlled carburetor air intake, Super-Filter air cleaner, 4-barrel carburetor, simplified intake manifold with water-jacketed passages and large intake valves—provide high intake efficiency. The modern single-bridge intake manifold distributes the fuel-air mixture more evenly for smoother performance. And its water-jacketed passages provide a more uniform fuel-air temperature.

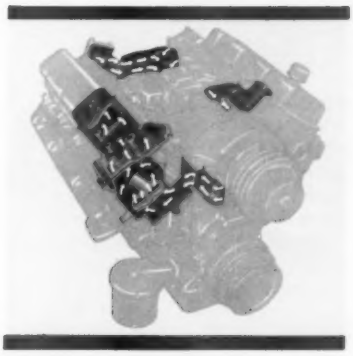
MACHINED COMBUSTION CHAMBERS—New wedge-shape combustion chambers are fully machined for accurate volume and compression control. Completely in the block, there's less heat in the heads for improved valve cooling. The face of the head is flat-machined at 90° for positive mating with the block. The new wedge-shape chamber design together with Turbulence-Top piston heads gives better fuel-air turbulence for snappy power and minimized combustion deposits, and advanced "over square" (bore larger than stroke) Short Stroke engine design increases usable horsepower and torque . . . cuts internal friction for long engine life and greater fuel economy.



LOW BACK-PRESSURE EXHAUST MANIFOLDING—Improved exhaust manifolding reduces back pressure . . . means more usable power and longer engine life. For full performance, burned gases must be properly removed to make room for a fresh charge of fuel-air mixture. And on the new Ford Super Duty V-8 engines exhaust gases leave through large exhaust ports, down wide passages in the cylinder head to the generously sized exhaust manifolds and out dual exhaust pipes to complete the breathing cycle most efficiently.

DESIGN features





MODERN 3-STAGE PARALLEL FLOW COOLING

1. HEAD – For cold starts, both thermostats are closed and the coolant is pumped through the cylinder head and manifold water jacket, returning through a bypass to the pump. This restricted flow continues until the coolant reaches 140°. The rapid head warm-up preheats the fuel-air mixture for more efficient burning and greater power. Fast block warm-up also occurs, warming the oil for better lubrication.

2. HEAD AND BLOCK–At 140°, the back thermostat opens allowing coolant to circulate more rapidly through the block. The coolant flows through the head, block and intake manifold water jacket, but closed front thermostat prevents it from flowing through the radiator. It returns through a bypass to the water pump and is recirculated. This continues until the coolant in the intake manifold reaches 160°.

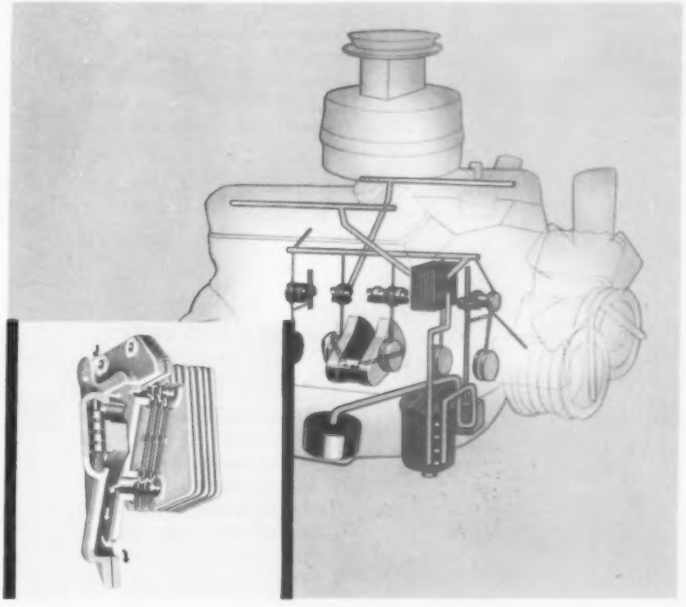
3. COMPLETE COOLING – At 160°, the front thermostat opens allowing the coolant to flow through the radiator and the entire cooling system. Approximately half of the coolant is directed to the heads and the other half to the block. This 3-stage system gives fast engine warm-up and effective cooling. Over ten thousand gallons of coolant per hour are pumped by the durable, high-capacity water pump.

NEW LUBRICATION SYSTEM

FULL-PRESSURE LUBRICATION SYSTEM – Oil is pumped under pressure through galleries in the block and head to the crankshaft main and connecting rod journals, camshaft journals, rocker shaft and arms, air compressor and timing gears. Valve stems, cam lobes, piston pins and valve lifters are effectively splash and gravity lubricated. Squirt holes in the connecting rods direct oil to cylinder walls.

Troublesome external oil lines have been virtually eliminated. And all oil is filtered passing through the large 2-quart Full-Flow oil filter.

INTERNAL OIL COOLING–A tremendous "plus" of the Ford lubrication system is the easily accessible internally mounted oil cooler. Standard equipment on all Super Duty V-8's, it's designed to keep the engine's oil at proper temperatures in extra-heavy-duty service. The oil cooler reduces oil temperatures to minimize carbonization . . . promotes greater oil film-strength . . . prolongs moving part life, main bearing, etc. . . . and extends time between oil changes.

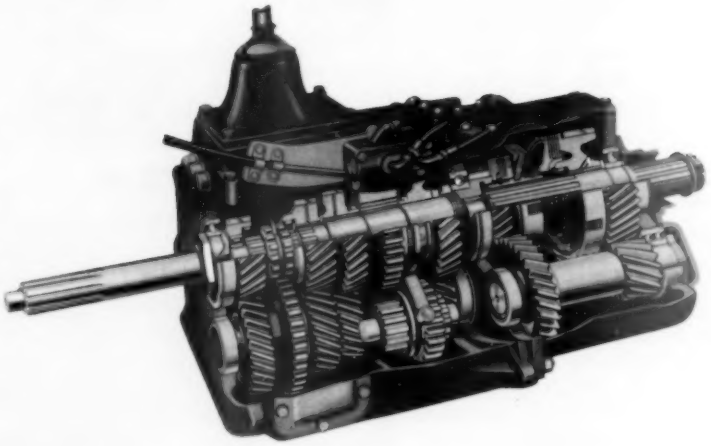


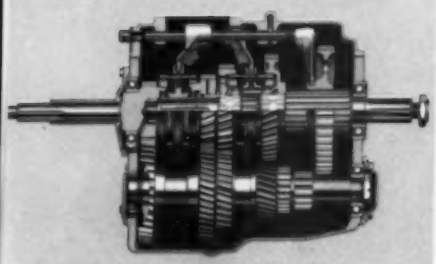
TWO-PLATE 13" CLUTCH — New, solid dual disc 13-inch clutch provides dependable, positive operation. Direct pressure is applied to the pressure plate by 12 coil springs. And the large facing area with two-plate design gives high torque capacity and long service.

For your extra-heavy-duty needs, Ford offers a wide selection of power train components designed for your individual requirements. Extra strength and capacity is engineered into each and every part to take the tremendous horsepower and torque output of the new Ford Super Duty engines . . . and to stand up under the big payloads Ford Extra Heavy Duty trucks are rated to haul. Transmissions, auxiliaries, clutches and Single- or Two-Speed rear axles are all engineered for outstanding performance and long, dependable service.

Extra strength in every

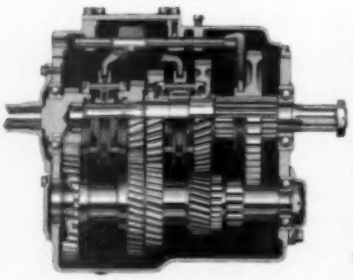
8-SPEED ROADRANGER — Designed for extra-heavy-duty over-the-road service, the Roadranger transmission provides 8 evenly spaced, progressive gear ratio steps. A four-speed constant mesh main gear box is coupled with an integrally mounted, synchronized Two-Speed reduction unit . . . giving 8 forward speeds to get loads under way faster and maintain highway speeds better. Shifting is powered by air, manually controlled by a convenient switch on the shift lever.





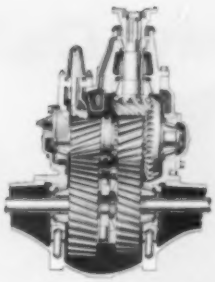
4000 SERIES SPICER TRANSMISSIONS

5-Speed Synchro-Silent, Direct-in-fifth transmissions are offered in a wide-ratio version, for use primarily with Single-Speed rear axles or with Two-Speed axles for off-the-road use. Close-ratio version for use with Two-Speed axles over-the-road.



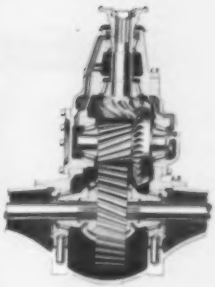
6000 SERIES SPICER TRANSMISSIONS

5-Speed Synchro-Silent, Direct-in-fifth or Overdrive-in-fifth (reduces engine revolutions about 17%) transmissions. Direct Drive is offered in both wide-ratio and close-ratio versions. Overdrive is close-ratio only.



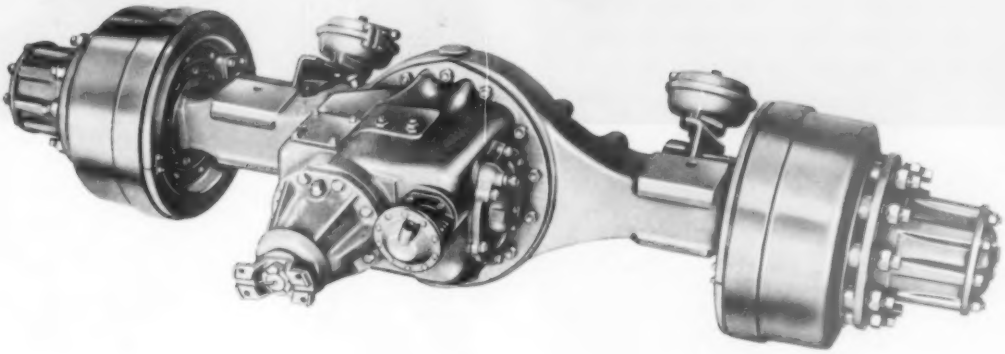
U-200

Rugged Single-Speed, double reduction, 29,000-lb. hypoid rear axle. Available with 6352 transmission on F- & C-1100 models. Not available on 99″ or 132″ wb. models.

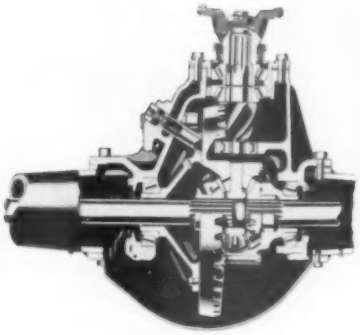


U-300

Big capacity Two-Speed, double reduction, 29,000-lb. hypoid rear axle. Available on F- & C-1100 models with 6352 transmission. Not available on 99″ or 132″ wb. models.

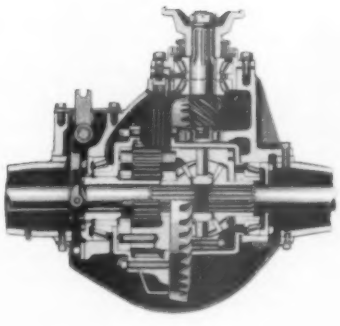


POWER TRAIN component



18,000-LB. SINGLE-SPEED
21,000-LB. SINGLE-SPEED
22,000-LB. SINGLE-SPEED

Spiral bevel, full-floating rear axle. Pinion is straddle-mounted for accurate alignment under high torque loads. All gears are alloy-steel, carburized and hardened for strength and wear resistance. And extra-capacity tapered-roller wheel bearings provide long, dependable service.

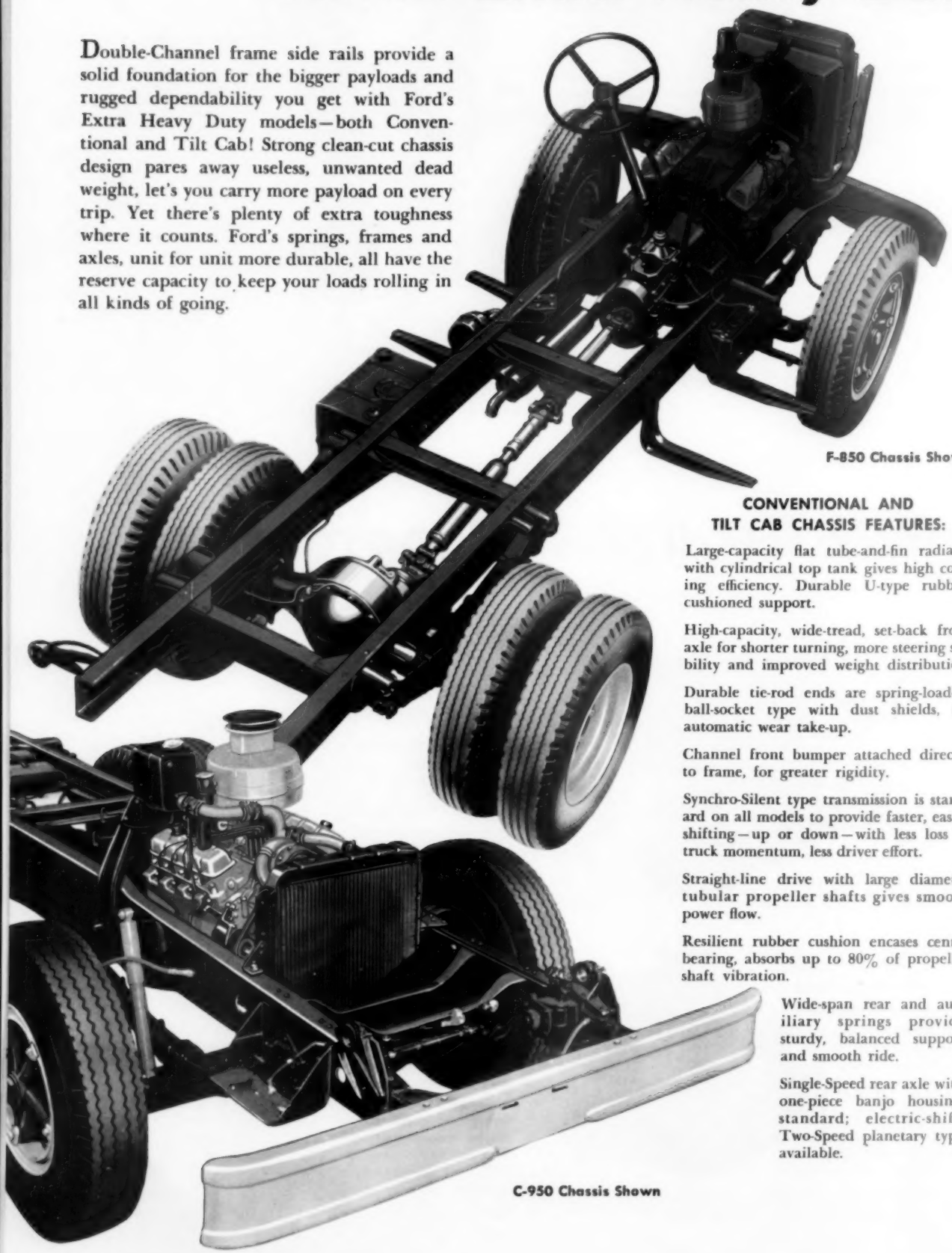


18,000-LB. TWO-SPEED
21,000-LB. TWO-SPEED
22,000-LB. TWO-SPEED

Spiral bevel, Two-Speed, full-floating rear axles. A planetary reduction gear set between the ring gear and differential provides two selective ratios for greater flexibility of truck operation. Easy to operate, positive-action, electric-shift control allows fast, easy shifting.

FORD Extra Heavy Duty

Double-Channel frame side rails provide a solid foundation for the bigger payloads and rugged dependability you get with Ford's Extra Heavy Duty models—both Conventional and Tilt Cab! Strong clean-cut chassis design pares away useless, unwanted dead weight, let's you carry more payload on every trip. Yet there's plenty of extra toughness where it counts. Ford's springs, frames and axles, unit for unit more durable, all have the reserve capacity to keep your loads rolling in all kinds of going.



F-850 Chassis Shown

C-950 Chassis Shown

CONVENTIONAL AND TILT CAB CHASSIS FEATURES:

Large-capacity flat tube-and-fin radiator with cylindrical top tank gives high cooling efficiency. Durable U-type rubber-cushioned support.

High-capacity, wide-tread, set-back front axle for shorter turning, more steering stability and improved weight distribution.

Durable tie-rod ends are spring-loaded, ball-socket type with dust shields, for automatic wear take-up.

Channel front bumper attached directly to frame, for greater rigidity.

Synchro-Silent type transmission is standard on all models to provide faster, easier shifting—up or down—with less loss of truck momentum, less driver effort.

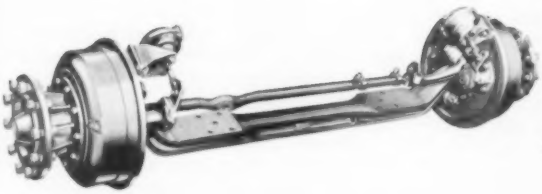
Straight-line drive with large diameter tubular propeller shafts gives smooth power flow.

Resilient rubber cushion encases center bearing, absorbs up to 80% of propeller shaft vibration.

Wide-span rear and auxiliary springs provide sturdy, balanced support and smooth ride.

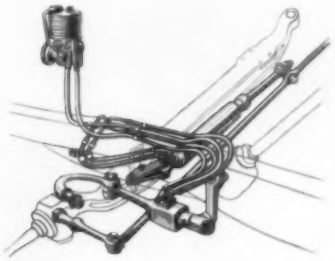
Single-Speed rear axle with one-piece banjo housing, standard; electric-shift, Two-Speed planetary type available.

chassis construction

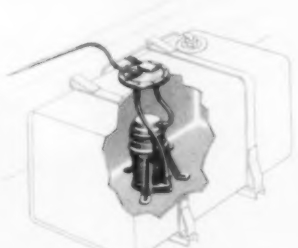


New Front Axles with modified I-beam construction, reinforced at stress points for extra durability. Available in 7000-, 9000-, 11000- and 15000-lb. capacities.

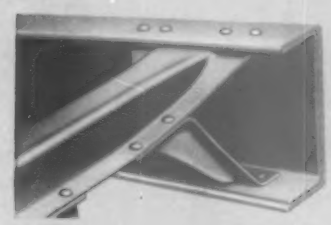
Roll-Action Steering with worm-and-roller type steering gear reduces friction, makes steering easier. Needle-bearing roller provides rolling rather than sliding action.



Master-Guide Power Steering is available on all F- and C-Series Extra Heavy Duty models . . . cuts steering effort as much as 75%.

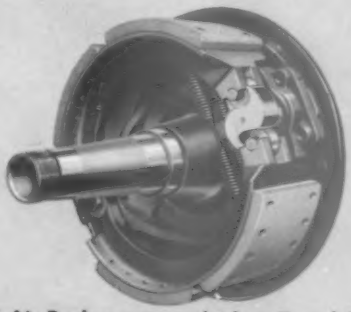


New Electric Fuel Pump mounted in fuel tank. Big capacity, submerged-type fuel pump delivers only liquid fuel—no vapor—under pressure from tank to carburetor. Not dependent on engine rpm's . . . provides ample fuel at any vehicle speed.

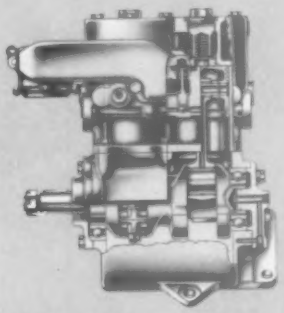


Double-Channel Frame Rails are engineered for extra strength and are highly resistant to twist and weave. Side rails have full channel reinforcement from front to rear springs.

Steering Linkage, solid Direct-Acting drag link, U-type steering arm and adjustable tie rod give excellent steering control and maneuverability.

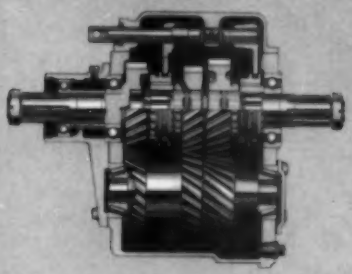


Full-Air Brakes are standard on F- and C-1000 and 1100 models, available 850 and 950. Compressor, two reservoir tanks, buzzer low-pressure indicator and air-operated windshield wipers included.

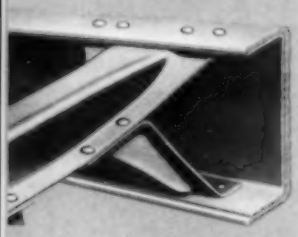


Big 12-cubic foot Air Compressor is available in place of standard 7¼-cu. ft. with full-air brakes on F- and C-950 thru 1100. Large 12-cubic foot per minute capacity provides extra safety factor.

FORD Tandem Chassis for

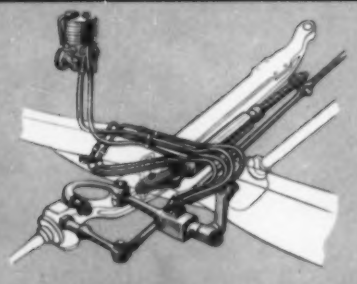


Two all-helical, 3-Speed Auxiliary constant mesh transmissions are available (except 144" wb. T-850) for greater operating flexibility.



Double-Channel frame side rails for extra strength, lower weight. Channel-reinforced from front spring to end of frame.

Roadranger Transmission with 8 closely spaced forward speeds and preselect range shifting is optional for all models. Not offered with auxiliary transmission.



Master-Guide Power Steering standard . . . always operative, cuts steering effort up to 75%.

Large capacity flat-tube radiator with cylindrical top tank gives high cooling efficiency. Durable U-type support.

High-capacity, wide-tread, set-back front axle provides shorter turning, more stability, improved weight distribution.

Durable tie-rod ends are spring-loaded, ball-socket type with dust shields, for automatic wear take-up.

Synchro-Silent 5-Speed direct transmission is standard for faster, easier shifting.

Channel front bumper attached directly to frame, for greater rigidity.

Tubular propeller shafts, large diameter, non-whipping. Long-lived needle-bearing joints. Rubber-encased drive line center bearing for longer life.

Torque arms absorb starting and stopping thrusts. Arms are rubber bushed at each end, and need no lubrication.

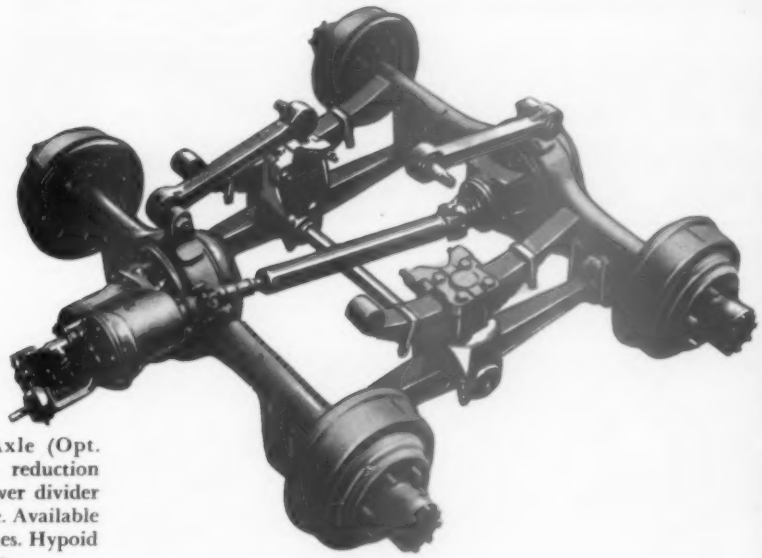
Power divider, provided with 3rd differential, equalizes the driving power between axles, eliminates axle fight for longer gear and tire life. The third differential may be locked out, to give positive drive to both rear axles.

T-950 Chassis

38D—38,000-lb. Tandem Axle (Std. T-950). Full-floating straight through drive axle with Single-Speed power divider on forward rear axle. Available with a choice of single reduction and planetary double reduction ratios. Equipped with full-air brakes.

extra payloads

More flotation is provided by eight rear tires . . . keeps truck from bogging down in mud, sand and other soft footing where single-rear-axle trucks would normally flounder. Walking-beam action levels bumps by 50%, minimizes "bounce."



28M—28,000-lb. Tandem Axle (Opt. T-850). Full-floating, single reduction type with a Single-Speed power divider mounted on forward rear axle. Available with hydraulic or full-air brakes. Hypoid ring gear and pinion gear sets.

Two equalizing beams provide true axle alignment, distribute weight between axles. Rubber bushings do away with the need for lubrication.

Husky, short-coupled springs minimize side-sway, absorb road shocks, give smooth, level ride.

34M—34,000-lb. Tandem Axle (Std. T-850). Full-floating, single reduction type with a Single-Speed power divider mounted on forward rear axle. Available with hydraulic or full-air brakes. Spiral bevel ring gear and pinion gear sets.

Differential lockout control located on the instrument panel permits driver to lock out differential action giving each axle the same positive traction as if separately driven.

F-SERIES POWER TRAIN SELECTIONS

Engine—Transmission—Axle Ratio (to 1) Combinations

Transmission	F-850 with 401 SD V-8 Engine		F-950 with 401 SD V-8 Engine	
	18,000-lb. axle	18,000-lb. 2-Speed axle	21,000-lb. axle	21,000-lb. 2-Speed axle
4652	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
4756C	—	6.50/8.87 or 7.17/9.77*	—	6.50/8.87 or 7.17/9.77*
6352	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
6852G	—	6.50/8.87 or 7.17/9.77*	—	6.50/8.87 or 7.17/9.77*
6453A	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
R-46	6.50	—	6.50	—

Transmission	F-1000 with 477 SD V-8		F-1000 with 477 SD V-8 F-1100 with 534 SD V-8		F-1100 with 534 SD V-8	
	21,000-lb. axle	21,000-lb. 2-Speed axle	22,000-lb. axle	22,000-lb. 2-Speed axle	29,000-lb. axle	29,000-lb. 2-Speed axle
6352	6.50 or 7.17	6.50/8.87	6.17 or 6.67	6.14/8.36 or 6.71/9.13†	7.03	6.42/8.38 or 7.09/9.07
6852G	—	6.50/8.87	—	6.14/8.36 or 6.71/9.13†	—	—
6453A	6.50 or 7.17	6.50/8.87	6.17 or 6.67	6.14/8.36 or 6.71/9.13†	—	—
R-46	6.50	—	6.17 or 6.67	—	—	—

*Not recommended for tractor service.

†Not recommended for tractor service on F-1100 Series.

F-850 Specifications GVW 25,000 lb. • GCW 50,000 lb.

AXLE, FRONT
Standard Axle Capacity—lb. 7,000
Optional Axle Capacity—lb. 11,000
Includes 5,000-lb. front springs. Requires air brakes, power steering and cast spoke or 10-hole disc wheels.

AXLE, REAR
Capacity—lb. 18,000
Standard—Type Single Reduction—Spiral Bevel—Full-Floating
Axle Ratios 6.50 or 7.17 to 1
Optional—Type Two-Speed Planet—Full-Floating
Ratios (to 1) 6.50/8.87 or 7.17/9.77*
*7.17/9.77 ratio not recommended for tractor service.

BRAKES, SERVICE
Standard—Type Vacuum-Power Operated, Hydraulic, Two-Shoe
Front: Double Anchor. Rear: Two-Cylinder, Self-Energizing
Front Brake (Drum Dia. x Lining Width—Thickness)—in. 16 x 2¾—0.25
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. 16 x 5—0.50
Total Area (Lining)—sq. in. 488.6
Booster (Effective Diaphragm Dia.)—in. 10¼
Optional—Type Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
Front Brake (Drum Dia. x Lining Width—Thickness)—in. 16 x 2½—0.312
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. 16½ x 6—0.75
Total Area (Lining)—sq. in. 579.3
Compressor 7¼ cu. ft. per min.
Air Reservoir Tanks Two—830-cu. in. Cap'y each

BRAKE, HAND
Standard—Type Drum and Contracting Band at Rear of Transmission on Drive Line
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) 10½ x 3—97.7
Optional—Type (with 6000 Series and R-46 Transmissions) Internal Shoe
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) 12 x 4—111.6

CLUTCH
Type Hydraulically Operated, 13-in., Constant Pressure Two-Plate
Total Frictional Area—sq. in. 378

COOLING SYSTEM
Type—Capacity—qt. Three-Stage—46
Thermostats Two, in Intake Manifold
Fan, Diameter—in. 21—5-Blade

DRIVE LINE
Type Hotchkiss, Straight-Line Drive
Propeller Shafts—Number Two, Tubular, Forged-Steel Ends
Universal Joints—Number, Type Three, Needle Roller Bearing
Center Bearing Rubber-Encased Ball Type

ELECTRICAL SYSTEM
Battery 12-Volt, 78-Plate, 70 Amp-Hr
Alternator 50 Amp., 750 Watts
Headlights Dual Sealed-Beam, Foot-Switch Beam Control
Starter High Torque, Ignition Key Starter Control
Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
Standard 226-hp 401 Super Duty V-8

FRAME
Side Rails—Type Parallel, Channel Section—Tapered Front and Rear
Max. Section (Depth x Flange x Thick.)—in. 9.5 x 3.0 x 0.25
Reinforcement Channel, Inside Side Rail
Max. Section (Depth x Flange x Thick.)—in. 9.0 x 2.56 x 0.15
Section Modulus 14.93
Cross Members—Type Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
18-gallon Frame-Mounted, Left Side
Optional 125-gal. Saddle Tanks; 100-gal. Step Tanks;
60-gal. Cylindrical Tank for Right and/or Left Side
(Cylindrical not avail. on 132" wb.; Step Tanks require Air Brakes)

SPRINGS

	Front	Rear Main	Rear Auxiliary
Semi-Elliptic, Ford Alloy Steel			
Length x Width—in.	52 x 3	56 x 3	37.5 x 3
Number of Leaves	7	10	7
Capacity at Spg. Pad (Norm. Defl.)—Per Spring	2500 lb.	7800 lb. (combined)	
Optional Spring Capacity	3000 lb.	8700 lb. (combined)	

STEERING
Standard—Type Worm and Dual Row Needle Bearing Roller
Wheel—Over-all Ratio 20-in. Dia., 3-Spoke—20.5 to 1

Wheelbase	132"	144"	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	46.2	49.5	52.8	58.0	62.7

Optional—Type Master-Guide Power Steering

TRANSMISSION
Standard Spicer 4652 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 4756C 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6453A 5-Speed Synchro-Silent Overdrive
Optional 8-Speed R-46 Roadranger (6.50 axle ratio and air brakes required)

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
4756C 5-Speed Direct	6.50	3.52*	1.93*	1.17*	1.00*	6.88
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)					

Power Take-Off Opening SAE 6-Bolt, On Both Sides
*Synchronized Speeds.

WHEELS AND TIRES (Standard)
Wheels—Number—Type Four—Cast Spoke
Rims—Number—Size Seven—22.5 x 6.75
Tires—Number—Size Six—10-22.5 10 PR

F-950 Specifications GVW 29,000 lb. • GCW 55,000 lb.

AXLE, FRONT
Standard Axle Capacity—lb. 9,000
Optional Axle Capacity—lb. 11,000
Includes 5,000-lb. front springs. Requires air brakes, power steering.

AXLE, REAR
Capacity—lb. 21,000
Standard—Type Single Reduction—Spiral Bevel—Full-Floating
Axle Ratios 6.50 or 7.17 to 1
Optional Type Two-Speed Planet—Full-Floating
Ratios (to 1) 6.50/8.87 or 7.17/9.77*
*7.17/9.77 ratio not recommended for tractor service.

BRAKES, SERVICE
Standard—Type Vacuum-Power Operated, Hydraulic, Two-Shoe
Front: Double Anchor. Rear: Two-Cylinder, Self-Energizing
Front Brake (Drum Dia. x Lining Width—Thickness)—in. 16 x 2¾—0.25
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. 16 x 6—0.50
Total Area (Lining)—sq. in. 556.2
Booster (Effective Diaphragm Dia.)—in. 9½
Optional—Type Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
Front Brake (Drum Dia. x Lining Width—Thickness)—in. 16¾ x 3½—0.44
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. 16½ x 6—0.75
Total Area (Lining)—sq. in. 650.0
Compressor 7¼ cu. ft. per min.
Air Reservoir Tanks Two—1,150-cu. in. Cap'y each
Optional Compressor 12 cu. ft. per min.

BRAKE, HAND
Standard—Type Drum and Contracting Band at Rear of Transmission on Drive Line
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) 10½ x 3—97.7
Optional—Type (with 6000 Series and R-46 Transmissions) Internal Shoe
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) 12 x 4—111.6

CLUTCH
Type Hydraulically Operated, 13-in., Constant Pressure Two-Plate
Total Frictional Area—sq. in. 378

COOLING SYSTEM
Type—Capacity—qt. Three-Stage—46
Thermostats Two, in Intake Manifold
Fan, Diameter—in. 21—5-Blade

DRIVE LINE
Type Hotchkiss, Straight-Line Drive
Propeller Shafts—Number Two, Tubular, Forged-Steel Ends
Universal Joints—Number, Type Three, Needle Roller Bearing
Center Bearing Rubber-Encased Ball Type

ELECTRICAL SYSTEM
Battery 12-Volt, 78-Plate, 70 Amp-Hr
Alternator 50 Amp., 750 Watts
Headlights Dual Sealed-Beam, Foot-Switch Beam Control
Starter High Torque, Ignition Key Starter Control
Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
Standard 226-hp 401 Super Duty V-8

FRAME
Side Rails—Type Parallel, Channel Section—Tapered Front and Rear
Max. Section (Depth x Flange x Thick.)—in. 9.75 x 3.50 x 0.28
Reinforcement Channel, Inside Side Rail
Max. Section (Depth x Flange x Thick.)—in. 9.20 x 3.03 x 0.25
Section Modulus 21.75
Cross Members—Type Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
18-gallon Frame-Mounted, Left Side
Optional 125-gal. Saddle Tanks; 100-gal. Step Tanks;
60-gal. Cylindrical Tank for Right and/or Left Side
(Cylindrical not avail. on 132" wb.; Step Tanks require Air Brakes)

SPRINGS

	Front	Rear Main	Rear Auxiliary
Semi-Elliptic, Ford Alloy Steel			
Length x Width—in.	52 x 3	56 x 3	37.5 x 3
Number of Leaves	7	10	7
Capacity at Spg. Pad (Norm. Defl.)—Per Spring	3000 lb.	9250 lb.	(combined)
Optional Spring Capacity	4000 lb.	10000 lb.	(combined)

STEERING
Standard—Type Worm and Dual Row Needle Bearing Roller
Wheel—Over-all Ratio 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	132"	144"	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	46.1	49.4	52.7	57.9	62.6

Optional—Type Master-Guide Power Steering

TRANSMISSION
Standard Spicer 4652 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 4756C 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
Optional Spicer 6453A 5-Speed Synchro-Silent Overdrive
Optional 8-Speed R-46 Roadranger (6.50 axle ratio and air brakes required)

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
4756C 5-Speed Direct	6.50	3.52*	1.93*	1.17*	1.00*	6.88
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
R-46 8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)					

Power Take-Off Opening SAE 6-Bolt, On Both Sides
*Synchronized Speeds.

WHEELS AND TIRES (Standard)
Wheels—Number—Type Four—Cast Spoke
Rims—Number—Size Seven—22.5 x 7.5
Tires—Number—Size Six—11-22.5 12 PR

F-1000 Specifications

GVW 30,000 lb. • GCW 55,000 lb. (Opt. GCW 65,000 lb.*)

**Requires 22,000-lb. rear axle*

AXLE, FRONT
- Standard Axle Capacity—lb. 9,000
- Optional Axle Capacity—lb. 11,000
  - Includes 5,000-lb. front springs. Requires power steering.
- Optional Axle Capacity—lb. 15,000
  - Includes 6,800-lb. front springs. Requires power steering.

AXLE, REAR
- Capacity—lb. 21,000
- Standard—Type: Single Reduction—Spiral Bevel—Full-Floating
  - Axle Ratios: 6.50 or 7.17 to 1
- Optional—Type: Two-Speed Planet—Full-Floating
  - Ratios (to 1): 6.50/8.87
- Optional Capacity—lb. 22,000
  - Type: Single Reduction—Spiral Bevel—Full-Floating
    - Axle Ratios: 6.17 or 6.67 to 1
  - Type: Two-Speed Planet—Full-Floating
    - Ratios (to 1): 6.14/8.36 or 6.71/9.13

BRAKES, SERVICE
- Standard—Type: Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Front Brake (Drum Dia. x Lining Width—Thickness)—in.: 16½ x 3½—0.44
- Rear Brake (Drum Dia. x Lining Width—Thickness)—in.: 16½ x 6—0.75
- Total Area (Lining)—sq. in.: 650.0
- Compressor: 7¼ cu. ft. per min.
- Air Reservoir Tanks: Two—1,150-cu. in. Cap'y each
- Optional Brakes (w/9,000- or 11,000-lb. Front and 22,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in.: 718.2
- Optional Brakes (w/15,000-lb. Front and 21,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in.: 664.6
- Optional Brakes (w/15,000-lb. Front and 22,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in.: 732.8
- Optional Compressor: 12 cu. ft. per min.

BRAKE, HAND
- Type: Internal Shoe at Rear of Transmission on Drive Line
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.): 12 x 4—111.6

CLUTCH
- Type: Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in.: 378

COOLING SYSTEM
- Type—Capacity—qt.: Three-Stage—46
- Thermostats: Two, in Intake Manifold
- Fan, Diameter—in.: 21—5-Blade

DRIVE LINE
- Type: Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number: Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type: Three, Needle Roller Bearing
- Center Bearing: Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery: 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator: 50 Amp., 750 Watts
- Headlights: Dual Sealed-Beam, Foot-Switch Beam Control
- Starter: High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard: 260-hp 477 Super Duty V-8

FRAME
- Side Rails—Type: Parallel, Channel Section—Tapered Front and Rear
  - Max. Section (Depth x Flange x Thick.)—in.: 9.75 x 3.50 x 0.28
- Reinforcement: Channel, Inside Side Rail
  - Max. Section (Depth x Flange x Thick.)—in.: 9.20 x 3.03 x 0.25
- Section Modulus: 21.75
- Cross Members—Type: Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon: Frame-Mounted, Left Side
- Optional: 125-gal. Saddle Tanks; 100-gal. Step Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side (Cylindrical not avail. on 132" wb.)

SPRINGS

	Front	Rear		
Semi-Elliptic, Ford Alloy Steel			Main	Auxiliary
Length x Width—in.	52 x 3	56 x 3		37.5 x 3
Number of Leaves	7	10		9
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	3000 lb.	9650 lb. (combined)		
Optional Spring Capacity	4000 lb.	10400 lb. (combined)		

STEERING
- Standard—Type: Worm and Dual Row Needle Bearing Roller
- Wheel—Over-all Ratio: 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	132"	144"	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	46.1	49.4	52.7	57.9	62.6

- Optional—Type: Master-Guide Power Steering

TRANSMISSION
- Standard: Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
- Optional: Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
- Optional: Spicer 6453A 5-Speed Synchro-Silent Overdrive
- Optional: 8-Speed R-46 Roadranger (6.17, 6.50 or 6.67 axle ratio required)

Gear Positions — Ratios (to 1):	First	Second	Third	Fourth	Fifth	Reverse
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09

- R-46 8-Speed Roadranger (9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)
- Power Take-Off Opening: SAE 6-Bolt, On Both Sides

*Synchronized Speeds.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type: Four—Cast Spoke
- Rims—Number—Size: Seven—22.5 x 7.5
- Tires—Number—Size: Six—11-22.5 12 PR

F-1100 Specifications

GVW 30,000 lb. • GCW 65,000 lb. (Opt. GVW 36,000 lb.*)

**Requires 11,000-lb. front axle, 29,000-lb. rear axle, HD rear main springs and special frame*

AXLE, FRONT
- Standard Axle Capacity—lb. 9,000
- Optional Axle Capacity—lb. 11,000
  - Includes 5,000-lb. front springs. Requires power steering.
- Optional Axle Capacity—lb. 15,000
  - Includes 6,800-lb. front springs. Requires power steering.

AXLE, REAR
- Capacity—lb. 22,000
- Standard—Type: Single Reduction—Spiral Bevel—Full-Floating
  - Axle Ratios: 6.17 or 6.67 to 1
- Optional—Type: Two-Speed Planet—Full-Floating
  - Ratios (to 1): 6.14/8.36 or 6.71/9.13*
- Optional Capacity—lb. 29,000**
  - Type: Double Reduction—Hypoid, Helical—Full-Floating
    - Axle Ratios: 7.03 to 1
  - Type: Two-Speed Double Reduction—Full-Floating
    - Ratios (to 1): 6.42/8.38 or 7.09/9.07

*6.71/9.13 ratio not recommended for tractor service.
**With 6352 Transmission only. Not available with 132" wb.

BRAKES, SERVICE
- Standard—Type: Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Front Brake (Drum Dia. x Lining Width—Thick.)—in.: 16½ x 3½—0.312
- Rear Brake (Drum Dia. x Lining Width—Thick.)—in.: 16½ x 7—0.75
- Total Area (Lining)—sq. in.: 718.2
- Compressor: 7¼ cu. ft. per min.
- Air Reservoir Tanks: Two—1,150-cu. in. Cap'y each
- Optional Brakes (w/15,000-lb. Front and 22,000- or 29-000-lb. Rear Axles)
  - Total Area (Lining)—sq. in.: 732.8
- Optional Compressor: 12 cu. ft. per min.

BRAKE, HAND
- Type: Internal Shoe at Rear of Transmision on Drive Line
- Size (Drum Diameter x Lining Width, in.—Lining Area, sq. in.): 12 x 4—111.6

CLUTCH
- Type: Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in.: 378

COOLING SYSTEM
- Type—Capacity—qt.: Three-Stage—47
- Thermostats: Two, in Intake Manifold
- Fan, Diameter—in.: 23—5-Blade

DRIVE LINE
- Type: Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number: Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type: Three, Needle Roller Bearing
- Center Bearing: Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery: 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator: 50 Amp., 750 Watts
- Headlights: Dual Sealed-Beam, Foot-Switch Beam Control
- Starter: High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard: 277-hp 534 Super Duty V-8

FRAME
- Side Rails—Type: Parallel, Channel Section—Tapered Front and Rear
  - Max. Section (Depth x Flange x Thick.)—in.: 9.75 x 3.50 x 0.28
- Reinforcement: Channel, Inside Side Rail
  - Max. Section (Depth x Flange x Thick.)—in.: 9.20 x 3.03 x 0.25
- Section Modulus: 21.75
- Cross Members—Type: Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon: Frame-Mounted, Left Side
- Optional: 125-gal. Saddle Tanks; 100-gal. Step Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side (Cylindrical not avail. on 132" wb.)

SPRINGS

	Front	Rear		
Semi-Elliptic, Ford Alloy Steel			Main	Auxiliary
Length x Width—in.	52 x 3	56 x 3		37.5 x 3
Number of Leaves	7	10		9
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	3000 lb.	9650 lb. (combined)		
Optional Spring Capacity	4000 lb.	10400 lb. (combined)		

STEERING
- Standard—Type: Worm and Dual Row Needle Bearing Roller
- Wheel—Over-all Ratio: 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	132"	144"	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	46.1	49.4	52.7	57.9	62.6

- Optional—Type: Master-Guide Power Steering

TRANSMISSION
- Standard: Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
- Optional: Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
- Optional: Spicer 6453A 5-Speed Synchro-Silent Overdrive
- Optional: 8-Speed R-46 Roadranger (6.17 or 6.67 axle ratio required)

Gear Positions — Ratios (to 1):	First	Second	Third	Fourth	Fifth	Reverse
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09

- R-46 8-Speed Roadranger (9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)
- Power Take-Off Opening: SAE 6-Bolt, On Both Sides

*Synchronized Speeds.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type: Four—Cast Spoke
- Rims—Number—Size: Seven—22.5 x 7.5
- Tires—Number—Size: Six—11-22.5 12 PR

C-SERIES POWER TRAIN SELECTIONS

Engine—Transmission—Axle Ratio (to 1) Combinations

	C-850 with 401 SD V-8 Engine		C-950 with 401 SD V-8 Engine	
Transmission	**18,000-lb. axle**	**18,000-lb. 2-Speed axle**	**21,000-lb. axle**	**21,000-lb. 2-Speed axle**
4652	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
4756C	—	6.50/8.87 or 7.17/9.77*	—	6.50/8.87 or 7.17/9.77*
6352	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
6852G	—	6.50/8.87 or 7.17/9.77*	—	6.50/8.87 or 7.17/9.77*
6453A	6.50 or 7.17	6.50/8.87 or 7.17/9.77*	6.50 or 7.17	6.50/8.87 or 7.17/9.77*
R-46	6.50	—	6.50	—

	C-1000 with 477 SD V-8		C-1000 with 477 SD V-8 C-1100 with 534 SD V-8		C-1100 with 534 SD V-8	
Transmission	**21,000-lb. axle**	**21,000-lb. 2-Speed axle**	**22,000-lb. axle**	**22,000-lb. 2-Speed axle**	**29,000-lb. axle**	**29,000-lb. 2-Speed axle**
6352	6.50 or 7.17	6.50/8.87	6.17 or 6.67	6.14/8.36 or 6.71/9.13†	7.03	6.42/8.38 or 7.09/9.07
6852G	—	6.50/8.87	—	6.14/8.36 or 6.71/9.13†	—	—
6453A	6.50 or 7.17	6.50/8.87	6.17 or 6.67	6.14/8.36 or 6.71/9.13†	—	—
R-46	6.50	—	6.17 or 6.67	—	—	—

*Not recommended for tractor service.

†Not recommended for tractor service on C-1100 Series.

C-850 Specifications GVW 26,000 lb. • GCW 50,000 lb.

AXLE, FRONT
Standard Axle Capacity—lb. . . . 9,000
Optional Axle Capacity—lb. . . . 11,000
Includes 5,000-lb. front springs. Requires air brakes, power steering and cast spoke or 10-hole disc wheels.

AXLE, REAR
Capacity—lb. . . . 18,000
Standard—Type . . . Single Reduction—Spiral Bevel—Full-Floating
Axle Ratios . . . 6.50 or 7.17 to 1
Optional—Type . . . Two-Speed Planet—Full-Floating
Ratios (to 1) . . . 6.50/8.87 or 7.17/9.77*
*7.17/9.77 ratio not recommended for tractor service.

BRAKES, SERVICE
Standard—Type . . . Vacuum-Power Operated, Hydraulic, Two-Shoe
Front: Double Anchor. Rear: Two-Cylinder, Self-Energizing
Front Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16 x 2¾—0.25
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16 x 5—0.50
Total Area (Lining)—sq. in. . . . 488.6
Booster (Effective Diaphragm Dia.)—in. . . . 10¼
Optional—Type . . . Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
Front Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16 x 2½—0.312
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16½ x 6—0.75
Total Area (Lining)—sq. in. . . . 579.3
Compressor . . . 7¼ cu. ft. per. min.
Air Reservoir Tanks . . . Two—830-cu. in. Cap'y each

BRAKE, HAND
Standard—Type . . . Drum and Contracting Band at Rear of Transmision on Drive Line
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) . . . 10½ x 3—97.7
Optional—Type (with 6000 Series and R-46 Transmissions) . . . Internal Shoe
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) . . . 12 x 4—111.6

CLUTCH
Type . . . Hydraulically Operated, 13-in., Constant Pressure Two-Plate
Total Frictional Area—sq. in. . . . 378

COOLING SYSTEM
Type—Capacity—qt. . . . Three-Stage—51
Thermostats . . . Two, in Intake Manifold
Fan, Diameter—in. . . . 21—5-Blade

DRIVE LINE
Type . . . Hotchkiss, Straight-Line Drive
Propeller Shafts—Number, Type . . . (99" & 111" wb.) One, Tubular, Forged-Steel Ends
(135" & 153" wb.) Two, Tubular, Forged-Steel Ends
Universal Joints—Number, Type . . . (99" & 111" wb.) Two, Needle Roller Bearing
(135" & 153" wb.) Three, Needle Roller Bearing
Center Bearing . . . Rubber-Encased Ball Type

ELECTRICAL SYSTEM
Battery . . . 12-Volt, 78-Plate, 70 Amp-Hr
Alternator . . . 50 Amp., 750 Watts
Headlights . . . Dual Sealed-Beam, Foot-Switch Beam Control
Starter . . . High Torque, Ignition Key Starter Control
Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignitidn Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
Standard . . . 226-hp 401 Super Duty V-8

FRAME
Side Rails—Type . . . Parallel, Channel Section—Tapered Front and Rear
Max. Section (Depth x Flange x Thick.)—in. . . . 9.5 x 3.0 x 0.25
Reinforcement . . . Channel, Inside Side Rail
Max. Section (Depth x Flange x Thick.)—in. . . . 9.0 x 2.56 x 0.15
Section Modulus . . . 14.93
Cross Members—Type . . . Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
18-gallon . . . Frame-Mounted, Left Side
Optional . . . 125-gal. Saddle Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side

SHOCK ABSORBERS (Front)
Standard—Type . . . Double-Acting, Telescopic

SPRINGS

	Front	Rear		
Semi-Elliptic, Ford Alloy Steel		Main	Auxiliary	
Length x Width—in.	57 x 3	56 x 3	37.5 x 3	
Number of Leaves	9	10	7	
Capacity at Spg. Pad (Norm. Defl.)—Per Spring	4000 lb.	7800 lb.	(combined)	
Optional Spring Capacity		8700 lb.	(combined)	

STEERING
Standard—Type . . . Worm and Dual Row Needle Bearing Roller
Wheel—Over-all Ratio . . . 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	99"	111"	135"	153"
Turning Circle Dia., Right or Left—ft.	37.9	41.1	47.7	52.6

Optional—Type . . . Master-Guide Power Steering

TRANSMISSION
Standard . . . Spicer 4652 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 4756C 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6453A 5-Speed Synchro-Silent Overdrive
Optional . . . 8-Speed R-46 Roadranger (6.50 axle ratio and air brakes required)

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
4756C 5-Speed Direct	6.50	3.52*	1.93*	1.17*	1.00*	6.88
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
R-46 8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev.11.01)					

Power Take-Off Opening . . . SAE 6-Bolt, On Both Sides
*Synchronized Speeds.

WHEELS AND TIRES (Standard)
Wheels—Number—Type . . . Four—Cast Spoke
Rims—Number—Size . . . Seven—22.5 x 6.75
Tires—Number—Size . . . Six—10-22.5 10 PR

C-950 Specifications GVW 30,000 lb. • GCW 55,000 lb.

AXLE, FRONT
Standard Axle Capacity—lb. . . . 9,000
Optional Axle Capacity—lb. . . . 11,000
Includes 5,000-lb. front springs. Requires air brakes, power steering.
Optional Axle Capacity—lb. . . . 15,000
Includes 6,800-lb. front springs. Requires air brakes, power steering.

AXLE, REAR
Capacity—lb. . . . 21,000
Standard—Type . . . Single Reduction—Spiral Bevel—Full-Floating
Axle Ratios . . . 6.50 or 7.17 to 1
Optional—Type . . . Two-Speed Planet—Full-Floating
Ratios (to 1) . . . 6.50/8.87 or 7.17/9.77*
*7.17/9.77 ratio not recommended for tractor service.

BRAKES, SERVICE
Standard—Type . . . Vacuum-Power Operated, Hydraulic, Two-Shoe
Front: Double Anchor. Rear: Two-Cylinder, Self-Energizing
Front Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16 x 2¾—0.25
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16 x 6—0.50
Total Area (Lining)—sq. in. . . . 556.2
Booster (Effective Piston Dia.)—in. . . . 9½
Optional—Type (w/9,000- or 11,000-lb. front axles) Full-Air, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
Front Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16¾ x 3½—0.44
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16½ x 6—0.75
Total Area (Lining)—sq. in. . . . 650.0
Compressor . . . 7¼ cu. ft. per min.
Air Reservoir Tanks . . . Two—1,150-cu. in. Cap'y each
Optional Compressor . . . 12 cu. ft. per min.
Optional Full Air Brakes (w/15,000 front axle)
Front Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 17¼ x 3½—0.44
Rear Brake (Drum Dia. x Lining Width—Thickness)—in. . . . 16½ x 6—0.50
Total Area (Lining)—sq. in. . . . 664.6

BRAKE, HAND
Standard—Type . . . Drum and Contracting Band at Rear of Transmision on Drive Line
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) . . . 10½ x 3—97.7
Optional—Type (with 6000 Series and R-46 Transmissions) . . . Internal Shoe
Size (Drum Dia. x Lining Width, in.—Lining Area, sq. In.) . . . 12 x 4—111.6

CLUTCH
Type . . . Hydraulically Operated, 13-in., Constant Pressure Two-Plate
Total Frictional Area—sq. in. . . . 378

COOLING SYSTEM
Type—Capacity—qt. . . . Three-Stage—51
Thermostats . . . Two, in Intake Manifold
Fan, Diameter—in. . . . 21—5-Blade

DRIVE LINE
Type . . . Hotchkiss, Straight-Line Drive
Propeller Shafts—Number, Type . . . (99" & 111" wb.) One, Tubular, Forged-Steel Ends
(135" & 153" wb.) Two, Tubular, Forged-Steel Ends
Universal Joints—Number, Type . . . (99" & 111" wb.) Two, Needle Roller Bearing
(135" & 153" wb.) Three, Needle Roller Bearing
Center Bearing . . . Rubber-Encased Ball Type

ELECTRICAL SYSTEM
Battery . . . 12-Volt, 78-Plate, 70 Amp-Hr
Alternator . . . 50 Amp., 750 Watts
Headlights . . . Dual Sealed-Beam, Foot-Switch Beam Control
Starter . . . High Torque, Ignition Key Starter Control
Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
Standard . . . 226-hp 401 Super Duty V-8

FRAME
Side Rails—Type . . . Parallel, Channel Section—Tapered Front and Rear
Max. Section (Depth x Flange x Thick.)—in. . . . 9.75 x 3.50 x 0.28
Reinforcement . . . Channel, Inside Side Rail
Max. Section (Depth x Flange x Thick.)—in. . . . 9.20 x 3.03 x 0.25
Section Modulus . . . 21.75
Cross Members—Type . . . Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps
18-gallon . . . Frame-Mounted, Left Side
Optional . . . 125-gal. Saddle Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side

SHOCK ABSORBERS (Front)
Standard—Type . . . Double-Acting, Telescopic

SPRINGS

	Front	Rear		
Semi-Elliptic, Ford Alloy Steel		Main	Auxiliary	
Length x Width—in.	57 x 3	56 x 3	37.5 x 3	
Number of Leaves	9	10	7	
Capacity at Spg. Pad (Norm. Defl.)—Per Spring	4000 lb.	9250 lb.	(combined)	
Optional Spring Capacity		10000 lb.	(combined)	

STEERING
Standard—Type . . . Worm and Dual Row Needle Bearing Roller
Wheel—Over-all Ratio . . . 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	99"	111"	135"	153"
Turning Circle Dia., Right or Left—ft.	37.9	41.2	47.8	52.7

Optional—Type . . . Master-Guide Power Steering

TRANSMISSION
Standard . . . Spicer 4652 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 4756C 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
Optional . . . Spicer 6453A 5-Speed Synchro-Silent Overdrive
Optional . . . 8-Speed R-46 Roadranger (6.50 axle ratio and air brakes required)

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
4756C 5-Speed Direct	6.50	3.52*	1.93*	1.17*	1.00*	6.88
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
R-46 8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)					

Power Take-Off Opening . . . SAE 6-Bolt, On Both Sides
*Synchronized Speeds.

WHEELS AND TIRES (Standard)
Wheels—Number—Type . . . Four—Cast Spoke
Rims—Number—Size . . . Seven—22.5 x 7.5
Tires—Number—Size . . . Six—11-22.5 12 PR

C-1000 Specifications

GVW 31,000 lb. • GCW 55,000 lb. (Opt. GCW 65,000 lb.*)

**Requires 22,000-lb. rear axle*

AXLE, FRONT
- Standard Axle Capacity—lb. ... 9,000
- Optional Axle Capacity—lb. ... 11,000
  - Includes 5,000-lb. front springs. Requires power steering.
- Optional Axle Capacity—lb. ... 15,000
  - Includes 6,800-lb. front springs. Requires power steering.

AXLE, REAR
- Capacity—lb. ... 21,000
- Standard—Type ... Single Reduction—Spiral Bevel—Full-Floating
  - Axle Ratios ... 6.50 or 7.17 to 1
- Optional—Type ... Two-Speed Planet—Full-Floating
  - Ratios (to 1) ... 6.50/8.87
- Optional Capacity—lb. ... 22,000
  - Type ... Single Reduction—Spiral Bevel—Full-Floating
  - Axle Ratios ... 6.17 or 6.67 to 1
  - Type ... Two-Speed Planet—Full-Floating
  - Ratios (to 1) ... 6.14/8.36 or 6.71/9.13

BRAKES, SERVICE
- Standard—Type ... Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Front Brake (Drum Dia. x Lining Width—Thickness)—in. ... 16½ x 3½—0.44
- Rear Brake (Drum Dia. x Lining Width—Thickness)—in. ... 16½ x 6—0.75
- Total Area (Lining)—sq. in. ... 650.0
- Compressor ... 7¼ cu. ft. per min.
- Air Reservoir Tanks ... Two—1,150-cu. in. Cap'y each
- Optional Brakes (w/9,000- or 11,000-lb. Front and 22,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in. ... 718.2
- Optional Brakes (w/15,000-lb. Front and 21,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in. ... 664.6
- Optional Brakes (w/15,000-lb. Front and 22,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in. ... 732.8
- Optional Compressor ... 12 cu. ft. per min.

BRAKE, HAND
- Type ... Internal Shoe at Rear of Transmission on Drive Line
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 12 x 4—111.6

CLUTCH
- Type ... Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in. ... 378

COOLING SYSTEM
- Type—Capacity—qt. ... Three-Stage—51
- Thermostats ... Two, in Intake Manifold
- Fan, Diameter—in. ... 21—5-Blade

DRIVE LINE
- Type ... Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number, Type ... (99" & 111" wb.) One, Tubular, Forged-Steel Ends (135" & 153" wb.) Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type ... (99" & 111" wb.) Two, Needle Roller Bearing (135" & 153" wb.) Three, Needle Roller Bearing
- Center Bearing ... Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery ... 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator ... 50 Amp., 750 Watts
- Headlights ... Dual Sealed-Beam, Foot-Switch Beam Control
- Starter ... High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard ... 260-hp 477 Super Duty V-8

FRAME
- Side Rails—Type ... Parallel, Channel Section—Tapered Front and Rear
  - Max. Section (Depth x Flange x Thick.)—in. ... 9.75 x 3.50 x 0.28
- Reinforcement ... Channel, Inside Side Rail
  - Max. Section (Depth x Flange x Thick.)—in. ... 9.20 x 3.03 x 0.25
- Section Modulus ... 21.75
- Cross Members—Type ... Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon ... Frame-Mounted, Left Side
- Optional ... 125-gal. Saddle Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side

SHOCK ABSORBERS (Front)
- Standard—Type ... Double-Acting, Telescopic

SPRINGS

	Front	Rear	
Semi-Elliptic, Ford Alloy Steel		Main	Auxiliary
Length x Width—in.	57 x 3	56 x 3	37.5 x 3
Number of Leaves	9	10	9
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	4000 lb.	9650 lb.	(combined)
Optional Spring Capacity		10400 lb.	(combined)

STEERING
- Standard—Type ... Worm and Dual Row Needle Bearing Roller
- Wheel—Over-all Ratio ... 20-in. Dia , 3-Spoke—24.4 to 1

Wheelbase	Turning Circle Dia., Right or Left—ft.
99"	37.7
111"	41.0
135"	47.6
153"	52.5

- Optional—Type ... Master-Guide Power Steering

TRANSMISSION
- Standard ... Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
- Optional ... Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
- Optional ... Spicer 6453A 5-Speed Synchro-Silent Overdrive
- Optional ... 8-Speed R-46 Roadranger (6.17, 6.50 or 6.67 axle ratio required)

Gear Positions Ratios (to 1):	First	Second	Third	Fourth	Fifth	Reverse
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
R-46 8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)					

- Power Take-Off Opening ... SAE 6-Bolt, On Both Sides

*Synchronized Speeds.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type ... Four—Cast Spoke
- Rims—Number—Size ... Seven—22.5 x 7.5
- Tires—Number—Size ... Six—11-22.5 12 PR

C-1100 Specifications

GVW 31,000 lb. • GCW 65,000 lb. (Opt. GVW 36,000 lb.*)

**Requires 11,000-lb. front axle, 29,000-lb. rear axle, HD rear main springs and special frame*

AXLE, FRONT
- Standard Axle Capacity—lb. ... 9,000
- Optional Axle Capacity—lb. ... 11,000
  - Includes 5,000-lb. front springs. Requires power steering.
- Optional Axle Capacity—lb. ... 15,000
  - Includes 6,800-lb. front springs. Requires power steering.

AXLE, REAR
- Capacity—lb. ... 22,000
- Standard—Type ... Single Reduction—Spiral Bevel—Full-Floating
  - Axle Ratios ... 6.17 or 6.67 to 1
- Optional—Type ... Two-Speed Planet—Full-Floating
  - Ratios (to 1) ... 6.14/8.36 or 6.71/9.13*
- Optional Capacity—lb. ... 29,000**
  - Type ... Double Reduction—Hypoid, Helical—Full-Floating
  - Axle Ratios ... 7.03 to 1
  - Type ... Two-Speed Double Reduction—Full-Floating
  - Ratios (to 1) ... 6.42/8.38 or 7.09/9.07

*Not recommended for tractor service.
**With 6352 transmission only. Not available with 99" wb.

BRAKES, SERVICE
- Standard—Type ... Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters, Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Front Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16¾ x 3½—0.44
- Rear Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16½ x 7—0.75
- Total Area (Lining)—sq. in. ... 718.2
- Compressor ... 7¼ cu. ft. per min
- Air Reservoir Tanks ... Two—1,150-cu. in. Cap'y each
- Optional Brakes (w/15,000-lb. Front and 22,000-lb. or 29,000-lb. Rear Axles)
  - Total Area (Lining)—sq. in. ... 732.8
- Optional Compressor ... 12 cu. ft. per min.

BRAKE, HAND
- Type ... Internal Shoe at Rear of Transmission on Drive Line
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 12 x 4—111.6

CLUTCH
- Type ... Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in. ... 378

COOLING SYSTEM
- Type—Capacity—qt. ... Three—52
- Thermostats ... Two, in Intake Manifold
- Fan, Diameter—in. ... 23—5-Blade

DRIVE LINE
- Type ... Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number, Type ... (99" & 111" wb.) One, Tubular, Forged-Steel Ends (135" & 153" wb.) Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type ... (99" & 111" wb.) Two, Needle Roller Bearing (135" & 153" wb.) Three, Needle Roller Bearing
- Center Bearing ... Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery ... 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator ... 50 Amp., 750 Watts
- Headlights ... Dual Sealed-Beam, Foot-Switch Beam Control
- Starter ... High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard ... 277-hp Super Duty V-8

FRAME
- Side Rails—Type ... Parallel, Channel Section—Tapered Front and Rear
  - Max. Section (Depth x Flange x Thick.)—in. ... 9.75 x 3.50 x 0.28
- Reinforcement ... Channel, Inside Side Rail
  - Max. Section (Depth x Flange x Thick.)—in. ... 9.20 x 3.03 x 0.25
- Section Modulus ... 21.75
- Cross Members—Type ... Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon ... Frame-Mounted, Left Side
- Optional ... 125-gal. Saddle Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side

SHOCK ABSORBERS (Front)
- Standard—Type ... Double-Acting, Telescopic

SPRINGS

	Front	Rear	
Semi-Elliptic, Ford Alloy Steel		Main	Auxiliary
Length x Width—in.	57 x 3	56 x 3	37.5 x 3
Number of Leaves	9	10	9
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	4000 lb.	9650 lb.	(combined)
Optional Spring Capacity		10400 lb.	(combined)

STEERING
- Standard—Type ... Worm and Dual Row Needle Bearing Roller
- Wheel—Over-all Ratio ... 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	Turning Circle Dia., Right or Left—ft.
99"	37.8
111"	41.1
135"	47.8
153"	52.8

- Optional—Type ... Master-Guide Power Steering

TRANSMISSION
- Standard ... Spicer 6352 5-Speed Synchro-Silent Direct-In-Fifth
- Optional ... Spicer 6852G 5-Speed Synchro-Silent Direct-In-Fifth
- Optional ... Spicer 6453A 5-Speed Synchro-Silent Overdrive
- Optional ... 8-Speed R-46 Roadranger (6.17 or 6.67 axle ratio required)

Gear Positions Ratios (to 1):	First	Second	Third	Fourth	Fifth	Reverse
6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33
6852G 5-Speed Direct	6.71	3.52*	1.97*	1.17*	1.00*	6.72
6453A 5-Speed Overdrive	6.07	3.40*	1.79*	1.00*	0.83*	6.09
R-46 8-Speed Roadranger	(9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01)					

- Power Take-Off Opening ... SAE 6-Bolt, On Both Sides

*Synchronized Speeds.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type ... Four—Cast Spoke
- Rims—Number—Size ... Seven—22.5 x 7.5
- Tires—Number—Size ... Six—11-22.5 12 PR

T-SERIES POWER TRAIN SELECTIONS

Engine—Transmission—Axle Ratio (to 1) Combinations

T-850

Transmission	401 SD V-8		477 SD V-8	534 SD V-8
	28,000-lb. axle	34,000-lb. axle	34,000-lb. axle	34,000-lb. axle
4652 w/o Aux.	7.07 or 7.79	7.80 or 8.60	—	—
4652 w/7231B	7.07 or 7.79	7.80 or 8.60	—	—
4652 w/7231D	7.07 or 7.79	7.80 or 8.60	—	—
6352 w/o Aux.	7.07 or 7.79	7.80 or 8.60	6.69 or 7.80	5.85, 6.69 or 7.80
6352 w/7231B	7.07 or 7.79	7.80 or 8.60	6.69 or 7.80	5.85, 6.69 or 7.80
6352 w/7231D	7.07 or 7.79	7.80 or 8.60	6.69 or 7.80	—
R-46	7.07 or 7.79	6.69 or 7.80	5.85, 6.69 or 7.80	5.85, 6.69 or 7.80

T-950

Transmission	401 SD V-8	477 SD V-8	534 SD V-8
	38,000-lb. axle	38,000-lb. axle	38,000-lb. axle
4652 w/o Aux.	7.60 or 8.38	—	—
4652 w/7231B	7.60 or 8.38	—	—
4652 w/7231D	7.60 or 8.38	—	—
6352 w/o Aux.	7.60 or 8.38	6.50, 7.60 or 8.38	5.57, 6.50, 7.60 or 8.38
6352 w/7231B	7.60 or 8.38	6.50, 7.60 or 8.38	5.57, 6.50, 7.60 or 8.38
6352 w/7231D	7.60 or 8.38	6.50, 7.60 or 8.38	6.50, 7.60 or 8.38
R-46	7.60	6.50 or 7.60	5.57 or 6.50

T-850 Specifications

GVW 43,000 lb. • GCW 70,000 lb. (Opt. GVW 37,000 or 45,000 lb.)—(Opt. GCW 55,000 lb.)

*Requires 28,000-lb. rear axle, 9,000-lb. front axle and 401 SD V-8
†Requires 34,000-lb. rear axle, 11,000-lb., or 15,000-lb. front axle, air brakes and maximum size wheels and tires

AXLE, FRONT
- Standard Axle Capacity—lb. ... 9,000
- Optional Axle Capacity—lb. ... 11,000*
  - Includes 5,000-lb. front springs.
- Optional Axle Capacity—lb. ... 15,000*
  - Includes 6,800-lb. front springs. *w/45,000-lb. GVW package only.

AXLE, REAR
- Capacity—lb. ... 34,000
- Type ... Single Reduction—Spiral Bevel—Full-Floating
- Axle Ratios ... (w/401 V-8) 6.69,* 7.80 or 8.60 to 1
- Optional Ratios ... (w/477 V-8) 5.85,* 6.69** or 7.80 to 1
  (w/534 V-8) 5.85,** 6.69** or 7.80 to 1

*Available only with R-46 transmission and air brakes.
**Available only with air brakes.

- Optional Capacity—lb. ... 28,000
- Axle Ratios ... (w/401 V-8) 7.07 or 7.79 to 1
  (includes 9-22.5 10 PR tires on 6.75 rims)

BRAKES, SERVICE
- Standard—Type ... Vacuum-Power Operated, Hydraulic, Two-Shoe
- Front Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16 x 2¼—0.25
- Rear Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16 x 5—0.50
- Total Area (Lining)—sq. in. ... 807.6
- Booster (Effective Dia.)—in. ... 9.5
- Optional Vacuum-Hydraulic Brakes (w/28,000-lb. Rear Axle)
  Total Area (Lining)—sq. in. ... 765.6
- Optional—Type ... Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters: Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Compressor ... 7⅛ cu. ft. per min.
- Air Reserve Tanks ... Three—830-cu. in. Cap'y each:
- Optional Full-Air Brakes (w/9,000-lb. front and 28,000-lb. rear)
  Total Area (Lining)—sq. in. ... 767.7
- Optional—Full-Air Brakes (w/9,000- or 11,000-lb. front & 34,000-lb. rear)
  Total Area (Lining)—sq. in. ... 904.7
- Optional Full-Air Brakes (w/15,000-lb. front and 34,000-lb. rear axles)
  Total Area (Lining)—sq. in. ... 1006.8
- Optional Compressor ... 12 cu. ft. per min.

BRAKE, HAND
- Standard—Type ... Drum and Contracting Band at Rear of Transmission on Drive Line
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 11½ x 4—142.7
- Optional Type (with R-46, 6,000 and 7,000 Series Transmissions) ... Internal Shoe
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 12 x 4—111.6

CLUTCH
- Type ... Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in. ... 378

COOLING SYSTEM
- Type—Capacity—qt. ... Three-Stage—46 (47 with 534 SD V-8)
- Thermostats ... Two, in Intake Manifold
- Fan, Diameter—in. ... 21 (23 with 534 SD V-8)—5-Blade

DRIVE LINE
- Type ... Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number ... Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type ... Three, Needle Roller Bearing
- Center Bearing ... Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery ... 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator ... 50 Amp., 750 Watts
- Headlights ... Dual Sealed-Beam, Foot-Switch Beam Control
- Starter ... High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard ... 226-hp 401 Super Duty V-8
- Optional ... 260-hp 477 Super Duty V-8†
- Optional ... 277-hp 534 Super Duty V-8†
  - †Optional main transmission required.

FRAME
- Side Rails—Type ... Parallel, Channel Section—Tapered Front, Full-Depth Rear
- Max. Section (Depth x Flange x Thick.)—in. ... 9.75 x 3.50 x 0.375
- Reinforcement ... Channel, Inside Side Rail
- Max. Section (Depth x Flange x Thick.)—in. ... 9.00 x 3.125 x 0.15
- Section Modulus ... 22.06
- Cross Members—Type ... Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon ... Frame-Mounted, Left Side
- Optional ... 125-gal. Saddle Tanks (except 144" wb.); 100-gal. Step Tanks, with air brakes only; 60-gal. Cylindrical Tank for Right and/or Left Side. (Cylindrical not avail. on 144" and 156" wb.)

SPRINGS

	Front	Rear
Semi-Elliptic, Ford Alloy Steel		
Length x Width—in.	52 x 3	34 x 4
Number of Leaves	8	12
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	4000 lb.	15500 lb.

STEERING
- Standard—Type ... Master-Guide Power Steering
- Wheel—Over-all Ratio ... 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	144"	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	49.4	52.7	58.0	62.6

TRANSMISSION

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
Standard 4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
Optional 6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33

- Optional R-46 8-Speed Roadranger ... (9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01) (Axle ratios required: 5.85, 6.69, 7.80, 7.79 or 7.07. Not available with auxiliary transmission.)
- Power Take-Off Opening ... SAE 6-Bolt, On Both Sides
- *Synchronized Speeds.

TRANSMISSION, AUXILIARY (except 144" wb.)

Gear Positions	Overdrive	Underdrive	Direct
Ratios (to 1):			
Optional Spicer 7231B 3-Speed	0.86	1.24	1.00
Optional Spicer 7231D* 3-Speed	0.86	2.14	1.00

*Not available with 534 SD V-8.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type ... Six—Cast Spoke
- Rims—Number—Size ... Eleven—22.5 x 6.75
- Tires—Number—Size ... Ten—10-22.5 10 PR

T-950 Specifications

GVW 46,000 lb. • GCW 75,000 lb. (Opt. GVW 48,000 or 51,000 lb.)

*Requires 11,000-lb. front axle
†Requires 15,000-lb. front axle

AXLE, FRONT
- Standard Axle Capacity—lb. ... 9,000
- Optional Axle Capacity—lb. ... 11,000
  - Includes 5,000-lb. front springs.
- Optional Axle Capacity—lb. ... 15,000
  - Includes 6,800-lb. front springs.

AXLE, REAR
- Capacity—lb. ... 38,000
- Type ... Single Speed—Spiral Bevel—Full-Floating
- Axle Ratios ... (w/401 V-8) 7.60 or 8.38 to 1
- Optional Ratios ... (w/477 V-8) 6.50, 7.60 or 8.38 to 1
  (w/534 V-8) 5.57,* 6.50, 7.60 or 8.38 to 1

*Not used in combination w/7231D auxiliary transmission.

BRAKES, SERVICE
- Standard—Type ... Full-Air, Heavy-Duty Two-Shoe with Slack Adjusters: Air Gauge on Instrument Panel, Air Windshield Wipers and Air Warning Buzzer
- Front Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16½ x 3½—0.312
- Rear Brake (Drum Dia. x Lining Width—Thick.)—in. ... 16½ x 6—0.75
- Total Area (Lining)—sq. in. ... 1061.8
- Compressor ... 7⅛ cu. ft. per min.
- Air Reservoir Tanks ... One—1275-cu. in.; Two—1395-cu. in. Cap'y each
- Optional Compressor ... 12 cu. ft. per min.
- Optional Brakes—(w/15,000-lb. Front and 38,000-lb. Rear Axles)
  Total Area (Lining)—sq. in. ... 1076.4

BRAKE, HAND
- Standard—Type ... Drum and Contracting Band at Rear of Transmission on Drive Line
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 11½ x 4—142.7
- Optional—Type (with R-46, 6,000 and 7,000 Series Transmissions) ... Internal Shoe
- Size (Drum Dia. x Lining Width, in.—Lining Area, sq. in.) ... 12 x 4—111.6

CLUTCH
- Type ... Hydraulically Operated, 13-in., Constant Pressure Two-Plate
- Total Frictional Area—sq. in. ... 378

COOLING SYSTEM
- Type—Capacity—qt. ... Three-Stage—46 (47 with 534 SD V-8)
- Thermostats ... Two, in Intake Manifold
- Fan, Diameter—in. ... 21 (23 with 534 SD V-8)—5-Blade

DRIVE LINE
- Type ... Hotchkiss, Straight-Line Drive
- Propeller Shafts—Number ... Two, Tubular, Forged-Steel Ends
- Universal Joints—Number, Type ... Three, Needle Roller Bearing
- Center Bearing ... Rubber-Encased Ball Type

ELECTRICAL SYSTEM
- Battery ... 12-Volt, 78-Plate, 70 Amp-Hr
- Alternator ... 50 Amp., 750 Watts
- Headlights ... Dual Sealed-Beam, Foot-Switch Beam Control
- Starter ... High Torque, Ignition Key Starter Control
- Parking Lights; Left Combination Stop and Taillight; Instrument Lights; Ignition Switch with Key Lock; Circuit Breakers; Rectifier

ENGINE
- Standard ... 226-hp 401 Super Duty V-8
- Optional ... 260-hp 477 Super Duty V-8‡
- Optional ... 277-hp 534 Super Duty V-8‡
  - ‡Optional main transmission required.

FRAME
- Side Rails—Type ... Parallel, Channel Section—Tapered Front, Full-Depth Rear
- Max. Section (Depth x Flange x Thick.)—in. ... 9.95 x 3.50 x 0.375
- Reinforcement ... Channel, Inside Side Rail
- Max. Section (Depth x Flange x Thick.)—in. ... 9.20 x 3.125 x 0.25
- Section Modulus ... 25.65
- Cross Members—Type ... Flanged "U" Type with Alligator Jaw or Channel Type

FUEL TANK (All Tanks include Electric Fuel Pumps)
- 18-gallon ... Frame-Mounted, Left Side
- Optional ... 125-gal. Saddle Tanks; 100-gal. Step Tanks; 60-gal. Cylindrical Tank for Right and/or Left Side. (Cylindrical not avail. on 156" wb.)

SPRINGS

	Front	Rear
Semi-Elliptic, Ford Alloy Steel		
Length x Width—in.	52 x 3	34 x 4
Number of Leaves	8	12
Capacity at Spg. Pad (Norm. Defl.)—Per Spg.	4000 lb.	15500 lb.

STEERING
- Standard—Type ... Master-Guide Power Steering
- Wheel—Over-all Ratio ... 20-in. Dia., 3-Spoke—24.4 to 1

Wheelbase	156"	175"	192"
Turning Circle Dia., Right or Left—ft.	52.7	57.9	62.6

TRANSMISSION

Gear Positions	First	Second	Third	Fourth	Fifth	Reverse
Ratios (to 1):						
Standard 4652 5-Speed Direct	7.40	4.00*	2.47*	1.46*	1.00*	7.84
Optional 6352 5-Speed Direct	7.31	4.09*	2.41*	1.44*	1.00*	7.33

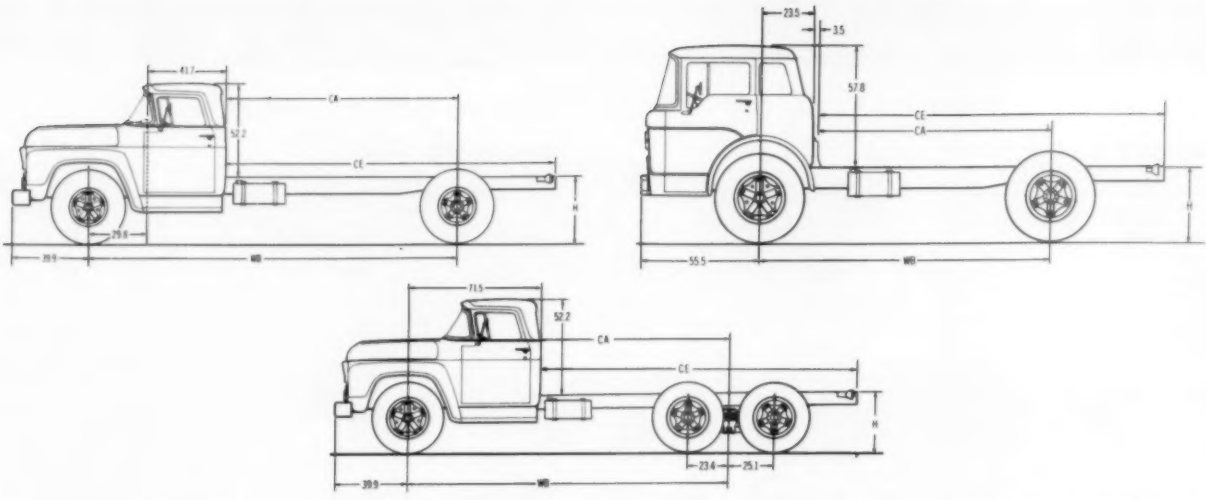
- Optional R-46 8-Speed Roadranger ... (9.78, 6.98, 4.99, 3.68, 2.66, 1.90, 1.36, 1.00, rev. 11.01) (Axle ratios required: 7.60 w/401 V-8, 6.50 or 7.60 w/477 V-8 and 5.57 or 6.50 w/534 V-8. Not available with auxiliary transmission.)
- Power Take-Off Opening ... SAE 6-Bolt, On Both Sides
- *Synchronized Speeds.

TRANSMISSION, AUXILIARY

Gear Positions	Overdrive	Underdrive	Direct
Ratios (to 1):			
Optional Spicer 7231B 3-Speed	0.86	1.24	1.00
Optional Spicer 7231D* 3-Speed	0.86	2.14	1.00

*Not available in combination with 534 SD V-8 and 5.57 axle ratio.

WHEELS AND TIRES (Standard)
- Wheels—Number—Type ... Six—Cast Spoke
- Rims—Number—Size ... Eleven—22.5 x 7.5
- Tires—Number—Size ... Ten—11-22.5 12 PR



DIMENSIONS AND CHASSIS WEIGHTS

MODEL	WB (in.)	CA (in.)	CE (in.)	Nom. Body Lengths (ft.)	Curb Weights* (lb.) Front	Rear	Total
					10-22.5 10 PR Tires		
	132	60.5	111.7	7½-9	3995	2930	6925
F-850	144	72.5	123.7	9-11	4010	2950	6960
GVW 25,000 lb.	156	84.5	135.7	10-13	4035	3000	7035
	175	103.5	163.5	13-16	4065	3065	7130
	192	120.5	180.5	15-19	4175	3035	7210
					11-22.5 12 PR Tires		
F-950	132	60.5	111.7	7½-9	4285	3255	7540
GVW 29,000 lb.	144	72.5	123.7	9-11	4320	3285	7605
	156	84.5	135.7	10-13	4365	3335	7700
	175	103.5	163.5	13-16	4420	3390	7810
	192	120.5	180.5	15-19	4460	3425	7885
					11-22.5 12 PR Tires		
F-1000	132	60.5	111.7	7½-9	4340	3530	7870
GVW 30,000 lb.	144	72.5	123.7	9-11	4375	3565	7940
	156	84.5	135.7	10-13	4420	3610	8030
	175	103.5	163.5	13-16	4475	3665	8140
	192	120.5	180.5	15-19	4510	3700	8210
					11-22.5 12 PR Tires		
F-1100	132	60.5	111.7	7½-9	4345	3700	8045
GVW 30,000 lb.	144	72.5	123.7	9-11	4380	3735	8115
OPT. GVW 36,000 lb.	156	84.5	135.7	10-13	4425	3780	8205
	175	103.5	163.5	13-16	4480	3835	8315
	192	120.5	180.5	15-19	4520	3875	8395
					10-22.5 10 PR Tires		
C-850	99	72	123.2	9-11	5030	2335	7365
GVW 26,000 lb.	111	84	135.2	10-13	5040	2355	7395
	135	108	168.0	13-16	5135	2410	7545
	153	126	186.0	16-20	5175	2450	7625
					11-22.5 12 PR Tires		
C-950	99	72	123.2	9-11	5205	2775	7980
GVW 30,000 lb.	111	84	135.2	10-13	5225	2805	8030
	135	108	168.0	13-16	5320	2880	8200
	153	126	186.0	16-20	5375	2935	8310
					11-22.5 12 PR Tires		
C-1000	99	72	123.2	9-11	5465	3025	8490
GVW 31,000 lb.	111	84	135.2	10-13	5495	3050	8545
	135	108	168.0	13-16	5560	3095	8655
	153	126	186.0	16-20	5610	3125	8735
					11-22.5 12 PR Tires		
C-1100	99	72	123.2	9-11	5465	3195	8660
GVW 31,000 lb.	111	84	135.2	10-13	5495	3220	8715
OPT. GVW 36,000 lb.	135	108	168.0	13-16	5560	3265	8825
	153	126	186.0	16-20	5610	3295	8905
					10-22.5 10 PR Tires		
T-850	144	72.5	128.5	10-11	4100	6020	10120
GVW 43,000 lb.	156	84.5	144.5	11-13	4140	6055	10195
OPT. GVW 45,000 lb.	175	103.5	175.5	13-16	4210	6105	10315
OPT. GVW 37,000 lb.	192	120.5	204.5	15-19	4275	6155	10430
					11-22.5 12 PR Tires		
T-950							
GVW 46,000 lb.	156	84.5	144.5	11-13	4670	6735	11405
OPT. GVW 48,000 lb.	175	103.5	175.5	13-16	4795	6860	11655
OPT. GVW 51,000 lb.	192	120.5	204.5	15-19	4840	6905	11745

FRAME HEIGHT AT REAR AXLE

SERIES	TIRE SIZE	H (in.) Empty	Loaded
F-850	10-22.5 10 PR	36.0	33.0
	11-22.5 12 PR	36.6	33.6
F-950 thru F-1100	11-22.5 12 PR	36.2	33.7
	11-24.5 12 PR	37.2	34.7
	12-22.5 12 or 14 PR	36.9	34.4
	12-24.5 12 PR	37.9	35.4
C-850	10-22.5 10 PR	35.1	32.9
	11-22.5 12 PR	35.7	33.5
C-950 thru C-1100	11-22.5 12 PR	36.1	33.7
	11-24.5 12 PR	37.1	34.7
	12-22.5 12 or 14 PR	36.8	34.4
	12-24.5 12 PR	37.8	35.4
T-850	10-22.5 10 PR	38.7	37.7
	11-22.5 12 PR	39.3	38.3
T-950	11-22.5 12 PR	40.3	39.3
	11-24.5 12 PR	41.3	39.3
	12-22.5 12 or 14 PR	41.0	40.0
	12-24.5 12 PR	42.0	41.0

OPTIONAL EQUIPMENT ADD WEIGHTS

	Front	Rear	Total
Axle, Front—11,000 lb.			
F-850	110	0	110
F-950, F-1000, F-1100, T-850, T-950	90	0	90
C-850, C-950	115	0	115
C-1000	80	0	80
C-1100	105	0	105
Axle, Front—15,000 lb.			
F-1000, F-1100	280	0	280
C-950	250	0	250
C-1000	330	0	330
C-1100	360	0	360
T-850, T-950	380	0	380
Axle, Rear—Single-Speed			
F-C-1000—22,000 lb.	0	90	90
F-C-1100—29,000 lb.	0	225	225
Axle, Rear—Two-Speed			
F-C-850—18,000 lb.	0	125	125
F-C-950, F-C-1000—21,000 lb.	0	25	25
F-C-1000—22,000 lb.	0	150	150
F-C-1100—29,000 lb.	0	325	325
Axle, Rear—Tandem			
T-850—28,000 lb.	0	345†	345†
Brakes, Full Air			
F-850, C-850	95	205	300
F-950, C-950	90	165	255
T-850	120	405	525
Power Steering (F- & C-Series)	100	0	100
Transmission—6000 Series			
F-850, F-950	110	35	145
T-850	65	20	85
T-950	95	30	125
Transmission—Roadranger			
F-850, F-950	195	40	235
F-1000, F-1100	75	15	90
C-850, C-950	185	100	285
C-1000, C-1100	60	25	85
T-850 (over 4000 Series)	195	35	230
T-950 (over 4000 Series)	170	40	210
Tires, Tubeless			
F-C-850 11-22.5 12 PR (7.5)	66	140	206
F-C-950 thru 1100 11-24.5 12 PR (8.25)	58	134	192
12-22.5 12 PR (8.25)	46	103	149
12-24.5 12 PR (8.25)	76	170	246
12-22.5 14 PR (8.25)	68	147	215
T-850 11-22.5 12 PR (7.5)	66	273	339
T-950 11-24.5 12 PR (8.25)	58	250	308
12-22.5 12 PR (8.25)	46	195	241
12-24.5 12 PR (8.25)	76	322	398
12-22.5 14 PR (8.25)	68	272	340

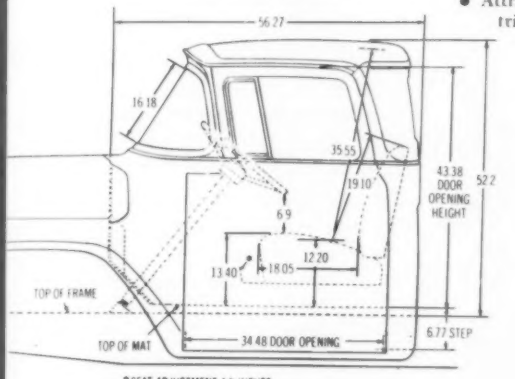
*All weights are estimated. Curb weights include standard cab and equipment, full tank of fuel, oil and lubricants. For Chassis-Cowl deduct 395 lb. "Front," 175 lb. "Rear" and 570 lb. "Total." †Deduct.

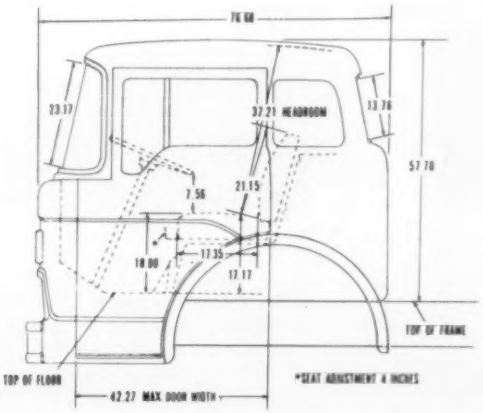
FORD Driverized Cabs

GREATEST CAB LUXURY AND VALUE—FORD'S CUSTOM CAB—

Conventional and Tilt (shown above) Add to Ford's standard cab features all these custom "extras," and you'll see why the Custom Cab is worth its small additional cost!

- Two-tone woven nylon-saran brown and white hound's-tooth pattern seat upholstery
- Foam-rubber padding in seat cushion
- Foam-rubber padding in seat back (driver's section, Tilt Cab)
- Thermacoustic headlining backed by one-half inch of glass wool insulation
- Sound deadener on floor and rear cab panel
- Insulation on cowl wall in cab (Conventional Cab)
- Attractive hardboard door and cowl-side trim panels (Conventional Cab)
- Arm rest on left door (Conventional Cab)
- Fold-down arm rest on driver's side (Tilt Cab)
- Large dome light with manual switch
- Sun visor on right side
- Illuminated cigar-cigarette lighter
- Bright-metal grille and hooded headlight assembly (Conventional Cab)
- Bright-metal windshield reveal molding
- Bright-metal parking light rims (Standard Tilt Cab)
- "Custom Cab" emblem on each door
- Matched locks on both doors





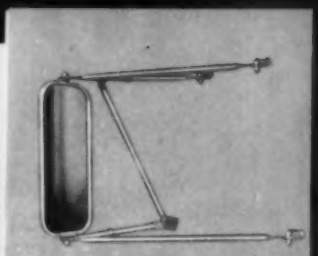
STANDARD CAB EQUIPMENT

(In addition to items listed on specification pages)

- Air Wing Ventilators in Doors
- Ammeter
- Ash Receptacle
- Cab All-Weather Ventilation (C-Series)
- Channel Front Bumper
- Choke Control
- Differential Lockout Control with Warning Light (T-Series)
- Dispatch Box
- Door Lock, Right Side
- Fuel Gauge
- Full-Wrap Windshield
- Hand Throttle
- Hi-Dri Cowl Ventilator (F- and T-Series)
- Horns, Twin Electric
- Inboard Cab Step
- Instrument Panel
- Light Switch
- Mirror, Rearview, Outside Left
- Oil Pressure Gauge
- Running Boards (F- and T-Series)
- Speedometer
- Sun Visor, Left Side
- Tachometer
- Tools
- Water Temperature Gauge
- Windshield Wipers, Dual Electric —Air on Air-Equipped Chassis

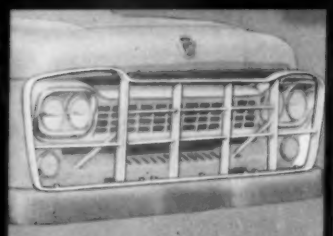
STANDARD COLORS

Choice of Vermilion, Midnight Blue, Azure Blue, Gunmetal Gray, Raven Black, Colonial White, Meadow Green, Seaspray Green, Goldenrod Yellow or Prime (F- and T-Series: on hood, fenders, cowl, cab, interior metal, inboard cab step, running boards and fuel filler cap. Any of the above colors can be combined with Colonial White for a smart Two Tone effect on the cab). (C-Series: on cab, interior metal, and inboard cab step.) Painted Raven Black are frame, door vent frame and glass channel, fuel tank, taillight, springs, axles, and wheels. Painted Colonial White are bumper, grille, dual headlight assembly, parking light rims and outside rearview mirror. Headlights and parking light rims are bright-metal on C-Series.

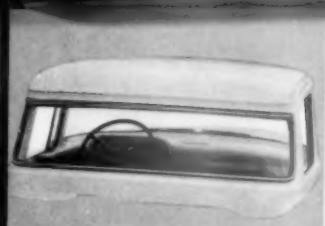


Full-view mirror (Western type) has a large 6 x 16 inch reflecting surface for maximum side and rear visibility. Adjustable arms and mirror.

Front-end power take-off for front-mounted pump, etc. Power take-off unit consisting of damper assembly and jack shaft available on Ford F- and T-Series.



Heavy-duty grille guard is braced to truck frame for grille, radiator and headlight protection. Rugged bar steel construction. Tow hooks also available.



Full-wrap rear window provides wide-angle visibility. Over 766 sq. in. available on F- & T-Series for Standard or Custom Cabs. Bright-metal molding around window.

FORD Accessories and Optional Equipment in addition to those previously shown:

REGULAR PRODUCTION OPTIONS

Air Horns, on air equipped models
Arm Rest, Left (Standard Cab)
Cab, Custom
Carrier, Spare Wheel
Heater and Defroster, MagicAire or Recirculating
Hydraulic Jack, 5-ton (F- & C-850), 8-ton (F- & C-950, 1000 & 1100; T-850 & 950)
Padded Instrument Panel and Cushioned Visors
Radio
Spare Tire, Tubeless
Sun Visor, right side (Standard Cab)
Tinted Glass
Tube-Type Tires
Turn Signals, Front & Rear
Windshield Washers
Wheels & Tires (Tubeless)

F- & C-850

(7) 22.5 x 7.5 Rims
(7) 22.5 x 7.5 Disc Wheels, 8-hole or 10-hole type
(6) 11-22.5 12 PR Tires*

**Heavy Duty rear springs and 7.5 rims or wheels required.*

F- & C-950, 1000 & 1100

(7) 22.5 x 8.25 Rims
(7) 24.5 x 8.25 Rims
(7) 22.5 x 7.5 Disc Wheels, 10-hole
(7) 22.5 x 8.25 Disc Wheels, 10-hole
(7) 24.5 x 8.25 Disc Wheels, 10-hole
(6) 11-24.5 12 PR Tires*
(6) 12-22.5 12 PR Tires*
(6) 12-24.5 12 PR Tires*
(6) 12-22.5 14 PR Tires*

**Heavy Duty rear springs and 8.25 rims or wheels required.*

T-850

(11) 22.5 x 7.5* Rims
(11) 22.5 x 6.75** Disc Wheels, 8-hole
(11) 22.5 x 7.5* Disc Wheels, 8-hole
(11) 22.5 x 7.5† Disc Wheels, 10-hole
(10) 10-22.5 10 PR Tires**
(10) 11-22.5 12 PR Tires*‡

**For highway operation only if used with 28,000-lb. axle.*
***With 28,000-lb. axle only.*
†With 34,000-lb. axle only.
‡22.5 x 7.5 rims or disc wheels required.

T-950

(11) 22.5 x 8.25 Rims
(11) 24.5 x 8.25 Rims
(11) 22.5 x 7.5 Disc Wheels, 10-hole
(11) 22.5 x 8.25 Disc Wheels, 10-hole
(11) 24.5 x 8.25 Disc Wheels, 10-hole
(10) 11-24.5 12 PR Tires*
(10) 12-22.5 12 PR Tires*
(10) 12-24.5 12 PR Tires*
(10) 12-22.5 14 PR Tires*

**8.25 rims or wheels required.*

PRE-APPROVED OPTIONS

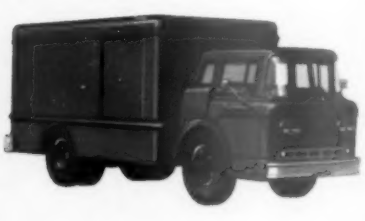
Arm Rest, Right Side for All Cabs
Cigar Lighter (Standard Cab)
Dome Light (Standard Cab)
Generator, Ford, 40 amp., 600 watts
Generator, 50 amp., 750 watt (T-850, T-950)
ICC Clearance Lights
Mirrors: Inside Safety;
Outside—Right, Non-Telescopic;
Left or Right, Telescopic (except C-Series)
Shock Absorbers, front (Std. on C-Series)
Spare Tire, Tube-type
Taillight, Right
Turn Signals, front only
Vacuum Reserve Tank, 1,000 cu. in. (F- & C-850, 950)

ACCESSORIES—DEALER INSTALLED

Fire Extinguisher
Locking Gas Tank Cap
Reflector Flares (3 in Kit) with Flags
Seat Belts
Seat Covers
Seat Cushion, Ventilated
Shaver, Electric
Splash Guards

Comparative information in this folder was obtained from authoritative sources, but is not guaranteed. The specifications contained herein were in effect at the time this folder was approved for printing. The Ford Division of Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation. All options and accessories illustrated or referred to as optional or available in this folder are at extra cost. For the price of the model with the equipment you desire, see your Ford Dealer.

FORD Division of FORD MOTOR COMPANY • DEARBORN, MICHIGAN



Printed in U.S.A —1/58

Form No. T-3158

PEOPLE IN THE NEWS

(Continued from page 32)

Kaiser Gypsum appointments

WILLIAM R. SOULE has been named administrative assistant to Claude E. Harper, vice president and general manager, Kaiser Gypsum Co., Oakland, Calif., and Robert O. Vaughan has been appointed administrative assistant to Colin L. Campbell, general sales manager. Paul J. Franklin, Jr., has been promoted to assistant operations manager and Howard L. Weightman to field service manager.

Mr. Soule, a graduate of the University of Arizona, Tucson, Ariz., with a B.S. degree in business administration, joined Kaiser Gypsum Co. four years ago as assistant controller. He has been with the Kaiser organization since 1941 and has held financial administrative positions with Henry J. Kaiser Co. and Kaiser Services.

Mr. Vaughan has been with the company since 1952. A graduate of the University of California, Berkeley, Calif., he was formerly systems and procedures analyst.

Mr. Franklin will continue to assist in the supervision of production at the gypsum products plants at Long Beach and Antioch, Calif., and Seattle, Wash. He joined the Kaiser organization in 1941 as a junior engineer, and is a science and engineering graduate of the University of California.

Mr. Weightman, former chief chemist at the Seattle plant, joined the company in 1947 at Long Beach. He attended the University of California at Los Angeles.

Trap Rock chairman

JOSEPH DIEHL FACKENTHAL has been named chairman of the board of directors of the New York Trap Rock Corp., West Nyack, N.Y. He has been legal counsel for the company since its organization in 1919 and has held the additional post of executive vice president since 1939.

PCA promotion assistant

THOMAS E. LONG has been named assistant to the vice president for promotion of the Portland Cement Association, Chicago, Ill. Formerly manager of the farm bureau, he will be succeeded by Maurice L. Burgener who has been agricultural engineer in the Bureau since 1949.

Mr. Long, a graduate of the University of Nebraska, Lincoln, Neb., with a B.S. degree in agricultural engineering, also completed additional structural, highway and sanitary engineering studies at the Illinois Institute of Technology. He joined the PCA in 1947 as assistant manager of the farm bureau, and became manager the following August. Prior to joining the Association, he served for three years as agricultural engineer in the commercial research division of Republic Steel Corp.

Mr. Burgener joined the Association in 1949 as agricultural engineer in the farm bureau. He holds B.S. and M.S. degrees in agricultural engineering from the University of Illinois, Urbana, Ill.

Joins consulting engineers

RONALD C. GRIFFIN, formerly production manager of Consolidated Rock Products Co., Los Angeles, Calif., has been appointed electrical and mechanical engineer for the firm of Arthur E. Howland Co., consulting engineers of Los Angeles.

UMA vice presidents

J. EASTMAN HATCH, president, Utah Sand & Gravel Corp., Salt Lake City, Utah, was elected first vice president of the Utah Manufacturers Association at a recent meeting of the board of directors. Charles E. Ward, president, Utah Concrete Pipe Co., Ogden, was named second vice president.

Penn-Dixie superintendent

CHARLES S. BENNETT has been named superintendent of operations at the Kingsport, Tenn., plant of Penn-Dixie Cement Corp., New York, N.Y. A native of Nazareth, Pa., and a graduate of Lehigh University, Bethlehem, Pa., with a B.S. degree in engineering, Mr. Bennett has been with the company since 1951. He has served as engineer in the Nazareth, Pa., plant and as plant engineer at Clinchfield, Ga.

PCA secretary

J. L. SCHNEIDER has been appointed secretary of the Portland Cement Association, Chicago, Ill. He has been assistant secretary since 1952. Mr. Schneider, who holds a B.S. degree in journalism from the University of Illinois, Urbana, Ill., joined the PCA in 1948 as editorial assistant in the advertising and publications bureau, and subsequently became publications editor, assistant manager and manager. He served as manager of the publications bureau from 1954 to 1957.

Century Rock president

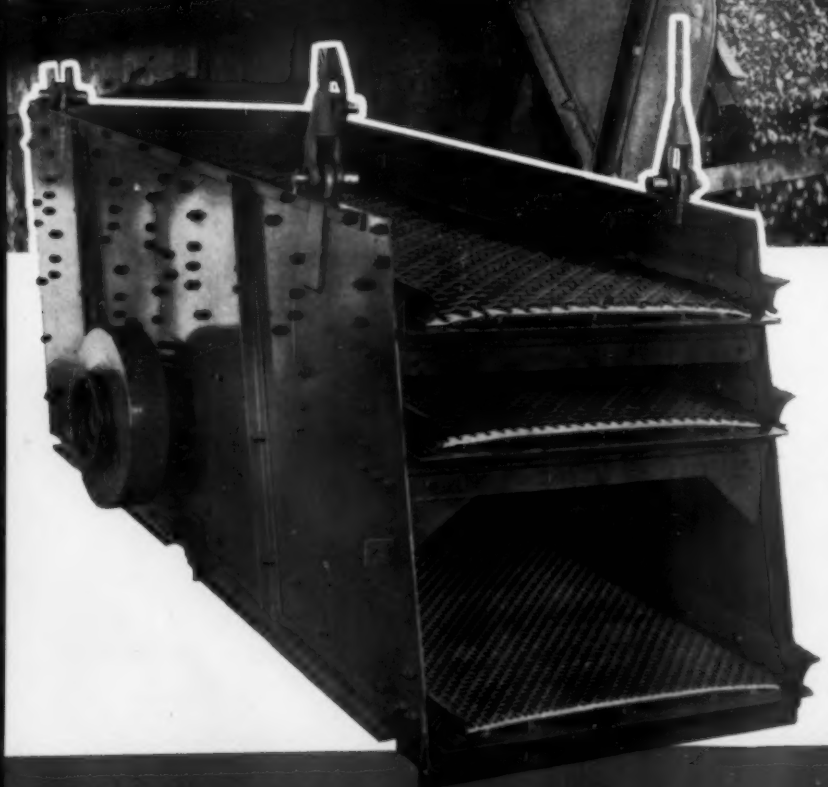
S. KEITH PAINTER has been elected president of Century Rock Products Co., El Monte, Calif., and of Star Rock Products Co., to succeed E. O. Rodeffer, founder of the companies, who has been named chairman of the board. Mr. Painter has also been named chairman of the board of Crown Rock Products Co., Admixtures, Inc., and of five affiliated San Gabriel ready-mixed concrete companies. Mr. Rodeffer continues as president of the ready-mixed concrete companies and of Admixtures, Inc.

Named superintendent

LEWIS P. JONES has been appointed superintendent of asphalt production for the New Haven Trap Rock Co., New Haven, Conn., according to an announcement by Albert L. Worthen, president. Mr. Jones will supervise production at the six asphalt plants located in North Branford, North Haven, Wallingford and Plainville. In addition, he will be in charge of the asphalt expansion program, which is now under way. Mr. Jones was formerly project manager for the Union Building Construction Corp., Passaic, New Jersey.

(Continued on page 60)

4 reasons why . . . you'll screen better with



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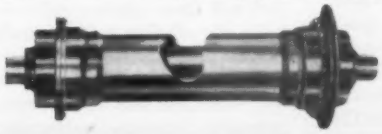
1 *For Longer Life*

20% - 30% HEAVIER AND STRONGER SHAFT

The stout-hearted SECO shaft will stand the gaff under peak loads . . . with an *extra* margin of safety. Heavier, stronger and with correspondingly heavier bearings.



3 *For Longer Life*

OIL BATH BEARING LUBRICATION

provides more thorough lubrication for longer bearing life. Flinger type seals *keep* the oil confined to the bearing cavity where it belongs . . . for easy starting in any weather.

TWIN-BEARING SCREENS

2 *For Easier Maintenance*

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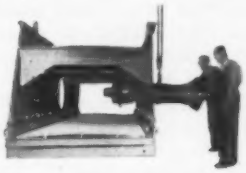

The entire shaft assembly can be quickly removed for any necessary parts replacement or to allow quick replacement of a complete spare assembly.

U. S. PATENT No. 2751080

4 **GREATER SHAFT ECCENTRICITY**

For Smoother Performance

and more accurate sizing. SECO design has greatly overcome an inherent characteristic of this design screen, in that there is practically no loss of the required vibration amplitude.

Here is profit-making NEWS for profit-minded producers. Now, SECO, with over 25 years of leadership in the vibrating screen industry . . . offers a complete line of TWIN-BEARING SCREENS . . . with engineering and construction features . . . that are paying-off in high tonnages at lower cost per ton on a wide variety of installations.

If you're planning new screens for your plant, or a new plant requiring screening, sizing, separating or de-watering of materials, put these stout-hearted SECO TWIN-BEARING SCREENS to work for you. Get the long life and dependability advantages of the super-duty shaft (20-30% heavier and stronger), Get the advantages of oil bath bearing lubrication and all the other features that make SECO TWIN-BEARING SCREENS first choice for better screening. Why not send your screening problem to SECO today?

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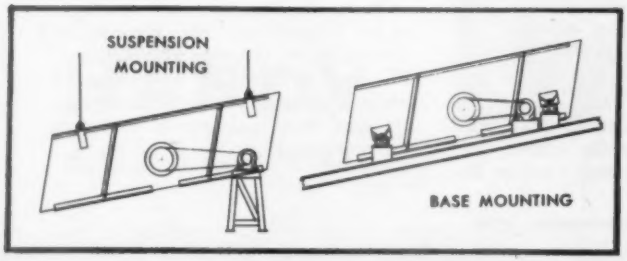

SECO
Twin-Bearing
SCREENS

PEOPLE IN THE NEWS

(Continued from page 57)

On RP sales staff

CHARLES L. LEMPERLY has joined the Chicago sales staff of ROCK PRODUCTS magazine as district manager. He was formerly Midwest manager for Stanley Publications, representing *Transportation Supply News, Jobber Product News* and *Fleet Product Quarterly*.

Prior to his association with Stanley Publications, Mr. Lemperly was with the Capper Publications in various sales capacities, mainly servicing advertisers in the Chicago area. Before joining the Capper organization, he worked in the Chicago area for Prairie Farmer Publishing Co. His sales background has included a year and a half in the western district office of the Sherwin-Williams Co. His advertising experience began with the T. J. Maloney Advertising agency in New York City shortly after graduating from Duke University, Durham, N.C.

PCA engineers

DANIEL A. SHANAHAN has been appointed field engineer of housing and products for the Portland Cement Association, Chicago, Ill., with headquarters in Detroit, Mich., according to an announcement by J. Gardner Martin, Michigan district engineer. A graduate of the University of Detroit with a degree in civil engineering, Mr. Shanahan was formerly engaged in sales work for American Prestressed Concrete, Inc., Detroit.

Elwin M. Pell, Kalamazoo, Mich., has been named structural field engineer with headquarters in Grand Rapids, Mich. He is a graduate of Western Michigan College, Kalamazoo, and received an M.S. degree in structural engineering from the University of Michigan, Ann Arbor, Mich. Prior to joining the Portland Cement Association, he served in the Michigan State Highway Department.

Claude M. Brown, Jr., has been named structural and concrete products engineer for northwestern Ohio, with headquarters in Toledo. A graduate of the University of Kentucky, Lexington, Ky., Mr. Brown was formerly a designer with the Kentucky Highway Department and Koppers Co.

Safety representative

CLINTON H. HOCH has been appointed staff representative for the Cement, Quarry, and Mineral Aggregates Section of the National Safety Council, Chicago, Ill. Mr. Hoch joined the Council last November after serving in Turkey and Brazil as safety engineer for the Paul Weir Co. of Chicago. He has also served as first aid and mine rescue instructor for the Pennsylvania Department of Mines.

Division manager

HENRY LUDWIG has been appointed manager of the plastering division of Consumers Co., Chicago, Ill. He was formerly with U. S. Gypsum Co.

Senior vice president

GERALD C. SALTARELLI has been elected senior vice president of Houdaille Industries, Inc., Buffalo, N.Y., and will have administrative responsibility for all Houdaille manufacturing plants and units. Mr. Saltarelli has served in various executive capacities for Houdaille and its predecessor corporations, Houdaille-Hershey Corp. and Frontier Industries, since shortly after his graduation from University of Buffalo Law School in 1938. Prior to his present appointment he was vice president in charge of operations. Mr. Saltarelli is also a member of the Houdaille board of directors.

Sales manager

CLARENCE L. RUDD, sales engineer of the Janesville Sand and Gravel Co., Janesville, Wis., since May, 1956, has been appointed acting sales manager to replace John Husen, vice president in charge of sales, who died while on a business trip to Minneapolis. A native of Callisburg, Texas, Mr. Rudd received his B.S. degree in mechanical engineering at the University of Wisconsin, Madison, Wis.

OBITUARIES

Albert R. Couchman, assistant to the operating vice president and general purchasing agent of the North American Cement Corp., New York, N.Y., died December 9 in Miami Beach, Fla. He was 63 years old. Mr. Couchman had been associated with the company for 42 years and had served as plant superintendent, safety manager, assistant sales manager and traffic manager before assuming the position of assistant to Paul M. Hedley, vice president of operations.

Frank Eaches, operating superintendent of the Neville Island, Pa., plant of the Green Bag Cement Division of Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., died November 30. He was 55 years old. A native of Superior, Ohio, Mr. Eaches had recently been promoted from general mill foreman to superintendent of cement production at the plant. Before joining Pittsburgh Coke & Chemical Co., Mr. Eaches served with the Federal Portland Cement Co. (now part of Penn-Dixie Cement Corp.), Superior Portland Cement, Inc., and Alpha Portland Cement Co.

John J. Dowdle, III, a vice president of Great Lakes Carbon Corp., New York, N. Y., died suddenly on November 11. He was 39 years of age. A graduate of Culver Military Academy, Culver, Ind., and Mount St. Mary's College, Emmitsburg, Md., Mr. Dowdle joined Great Lakes Carbon in 1945 as assistant to the general manager.

Harley E. Hammer, works manager of the Plaster City, Calif., plant of the United States Gypsum Co., Chicago, Ill., died suddenly on November 23 while pheasant hunting with friends. He had been manager of the plant for nine years.

END

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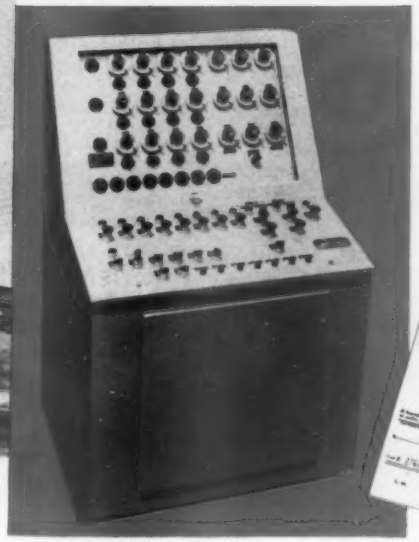

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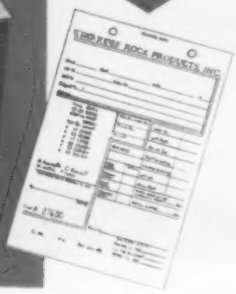

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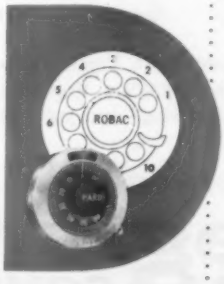

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SUPER STEPPED-END

...3 big steps ahead of other stepped-end bags!

1. 3 TIMES MORE PROTECTION AGAINST SIFTING!

With exclusive new Staggered Flap construction, end flaps of the bag overlap not just once, but three different times to seal bag ends completely! Result: St. Regis Super Stepped-End Bags give you 3 different guards against siftage . . . 3 times more effective protection against product loss . . . *cleaner* bags!

2. FASTER, EASIER FILLING . . . CLEANER BAGS!

Note the new Full Insert on St. Regis Super Stepped-End Bags. This feature, tested over and over again in St. Regis laboratories and in the field, effectively reduces blow-back and siftage at the valve. And, improved pasting makes it easier to place the bag on the filling tube . . . helps step up your production!

3. ALL-PLY PROTECTION IN ALL CORNERS!

No inner ply cut-out corners to weaken the bag! With new Staggered Flaps, St. Regis is first to give you extra protection against siftage plus maximum strength in all four corners. Most important of all, St. Regis Super Stepped-End Bags give you the advantage of complete product protection. Since corners are not cut out, only the sheet designed for the job touches the product!

Stepped-End Bags were invented and developed by St. Regis. To date, more than 200 million have been bought by industries looking for better packaging. For a full demonstration of this important new development—the Super Stepped-End Bag—call your St. Regis representative today!

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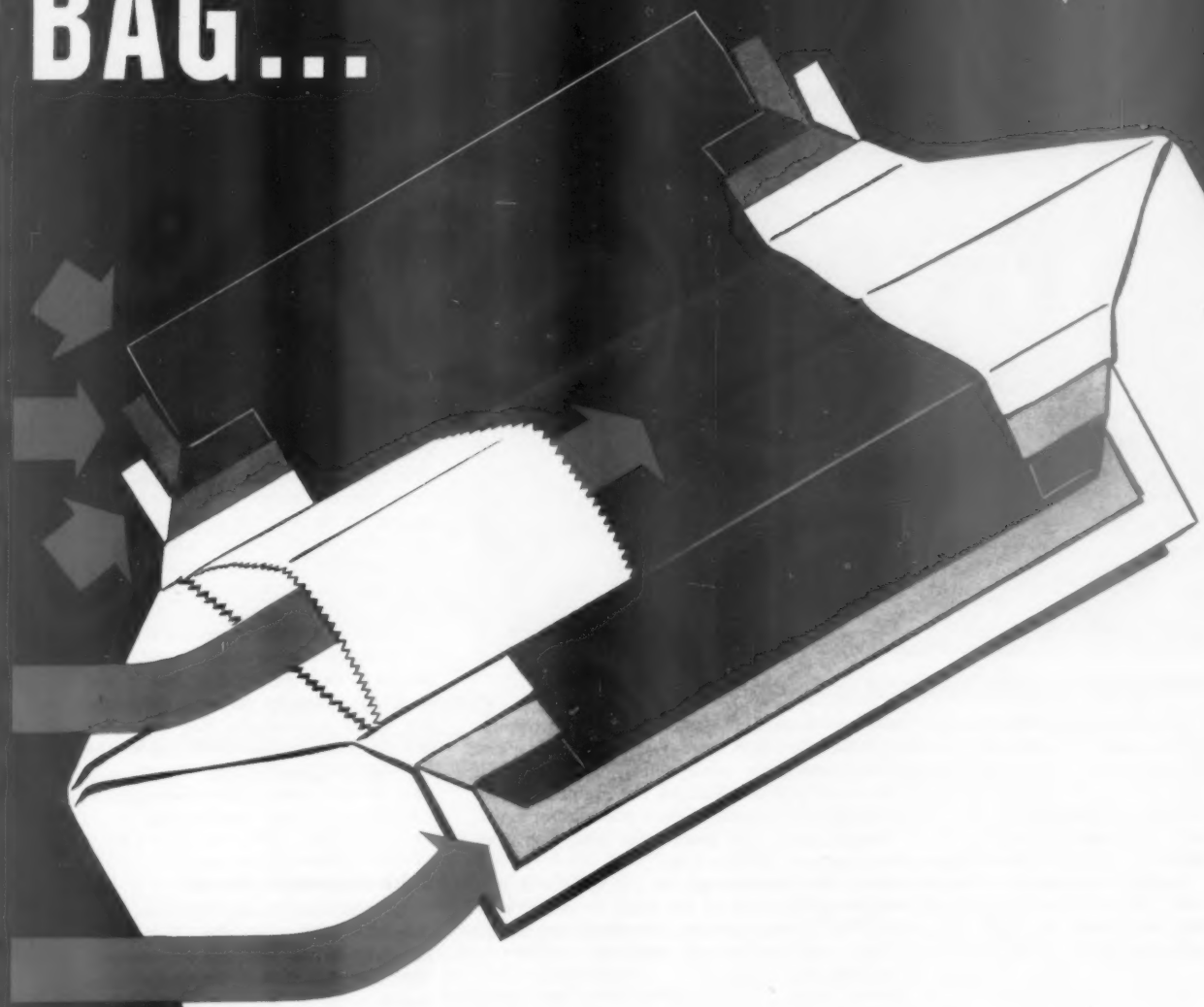

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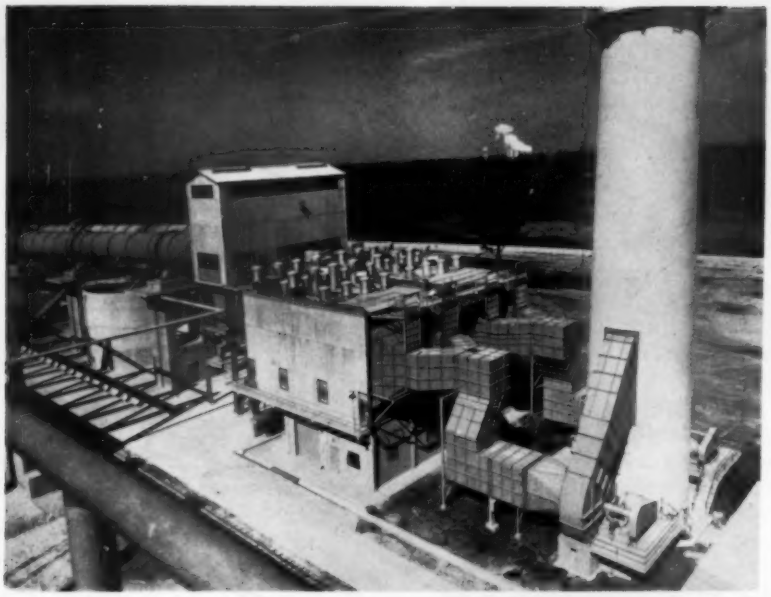
INDUSTRY NEWS



New plant boasts spic and span cleanliness

THE NEW LAKE CHARLES, LA., PLANT of Lone Star Cement Co. uses precipitators to clean its kiln gases even though the plant is in the bayous far from centers of population. Key equipment is the electrostatic precipitator (center) which cleans the gases before they reach the stack at right. Built by the Metal Products Division of Koppers Co., Inc., the installation consists of four precipitator units, each with two functioning fields through which the gases must pass, and connected by ducts so that two units serve each of the two kilns.

Induced draft to draw the gases from the kilns through the precipitator is provided by fans, one of which can be seen at the base of the stack at lower right. The installation has been designed so that a third precipitating field may be installed in space already provided at the stack end of each chamber.

Acquires Calunite stock

HYDROCARBON CHEMICALS, INC., New York, N.Y., has acquired the bulk of the common stock of Calunite Corp. The transaction involves 762,000 shares of the company's stock for $38,000, plus a loan to it of $22,000. Calunite Corp. mines alunite in Marysvale, Utah, and makes a calunite fertilizer in Pomona, Calif.

Sand, gravel company installs new equipment

GOODWIN SAND & GRAVEL CO., Mt. Vernon, Ohio, has installed a new, all-electrically operated plant which began production last fall. Fred J. Goodwin, owner and manager, said productive capacity of the plant is 200 tons per hour.

Quarry wins decision

WAUWATOSA STONE CO., Wauwatosa, Wis., was granted access to its quarry in a decision by the Wisconsin Supreme Court. The cities of Milwaukee and Wauwatosa had appealed an earlier decision awarded in the stone company's favor by Circuit Judge R. A. Drechsler.

The court approved the route for trucks ordered by Judge Drechsler, agreeing that the quarry was a legal nonconforming use and that ingress and egress could not be blocked.

Gypsum sales gains forecast for 1958

NATIONAL GYPSUM CO., Buffalo, N.Y., is budgeting a $5-million sales increase for the first half of this year, according to Melvin Baker, chairman of the board. He foresaw a probable sales increase of at least $10 million for the whole year. This would indicate the company expects net sales in 1958 to approximate $152 million. Net earnings this year, said Mr. Baker, ought to average about 10 percent of total sales.

Mr. Baker feels that housing starts this year will climb to about 1,050,000 from their downward trend last year. National Gypsum plans the completion of its asbestos mine and milling operation in Thetford Mines, Quebec, Canada, in April, furnishing the fiber for its three asbestos products plants.

Not only will the company look into product improvement and new products, said Mr. Baker, but it will seek new uses for its raw materials. He noted particularly that this year his company hopes to broaden the market for lime which it presently sells for uses ranging from fertilizer to bleaching in paper production.

Lime shipment record

U. S. BUREAU OF MINES reports that August, 1957, set the "all-time" monthly record for lime shipments—859,000 tons. However, lime shipments dropped 103,000 tons in September, 1957, to 756,000 tons. Most of the decline was reflected in dead-burned dolomite shipments, which decreased 76,000 tons, and secondly in building lime. Chemical lime remained about the same, only losing a few thousand tons.

Erects office building

NEW YORK TRAP ROCK CORP. has moved its executive offices, formerly of 230 Park Ave., New York City, together with its operating and engineering offices, formerly in Newburgh, N.Y., to a new building which it has erected on Old Mill Road, West Nyack, Rockland County, N.Y.

(Continued on page 68)

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You're looking at a typical example of a Cedarapids Unitized Plant. The photo above shows one of the five different combinations of five Cedarapids units used by one contractor to handle material in three different pits and meet a wide variety of specifications. The five set-ups used on the job are detailed below.

SET-UP 1—As shown above, five Unitized Units were used . . . a Ground-Level Feeder, 2236 Portable Primary, Twin Jaw Scalping Plant, Commander Tandem Plant with pre-screening attachment, and a 4024 Roll Crusher Secondary.

SET-UP 2—Three of the same units used in the first set-up . . . Feeder, Scalper, and Roll Secondary . . . produced 220 tons per hour of minus ¾" material.

SET-UP 3—The Commander Plant with pre-screening attachment, was used alone to produce 170 tons per hour of minus ¾".

SET-UP 4—Operating independently in the same pit as Set-up 2, the Commander and Twin Jaw Scalper with the Roll Secondary Plant averaged 3000 tons of ¾" material in a 9-hour period, which included waiting time for trucks.

SET-UP 5—The Portable Primary and Commander Plant with pre-screening attachment were combined.

How you can meet every aggregate specification with ONE CEDARAPIDS UNITIZED PLANT

So far we haven't found any aggregate specification or volume requirement which cannot be met by one of the many different combinations of Cedarapids units that make up a Cedarapids Unitized Plant!

Unitized is the key word. Cedarapids manufactures every type and size of crushing and screening unit that experience has shown is needed to produce aggregate from any pit or quarry, in any quantity, and meet every specification. This equipment is *Unitized* . . . each unit is matched to every other unit for balanced production. Each unit complements every other in handling efficiently its part of the aggregate processing procedure. These units can be combined in dozens of different ways to meet whatever capacity and finished product demands your job calls for.

Perhaps one Cedarapids unit will do your job . . . maybe you need three, or five, if your capacity requirements run into the thousands of tons per hour, your pit conditions are difficult to crack, or the specifications you have to meet are unusually exacting.

With the big contracts coming up for the Highway Program, we urge you to get the facts about what a Cedarapids Unitized Plant can do for you. Talk to the many big-time operators who use them, then see your Cedarapids Dealer for specific details.

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INTERNATIONAL six-wheelers cover the range from 22,000 lbs. GVW to 76,000 lbs. GCW in conventional and COE design. There is one practically custom-built for every hauling job in the world's most complete truck line. Widest choice of load-moving and load-carrying components to keep operating and maintenance cost lowest.

INTERNATIONAL **pickups with four-wheel drive** are all-truck built to give you the extra traction and pull to meet the toughest on- and off-highway requirements. Extra wide seats allow plenty of elbow room for three big men. And remember, you get the most powerful "six" in its class.

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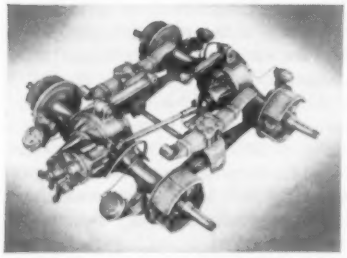
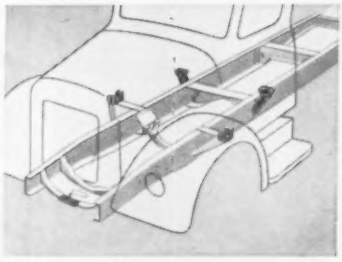
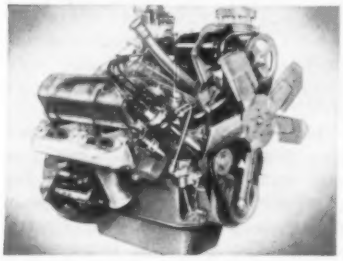
Just one reason why you'll find International Trucks cost least to own!



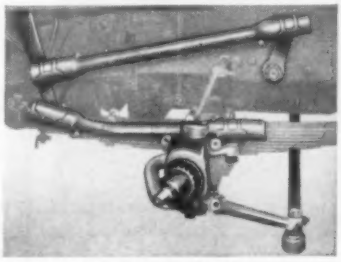
Plenty of pull on- and off-highway with sturdy, long lasting tandems. You get extra flotation, positive traction always.



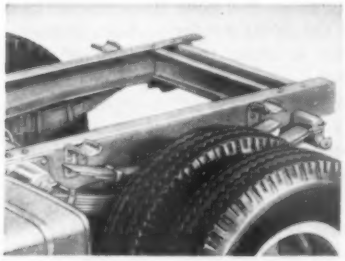
Cabs last longer even in the most severe operations with exclusive 5-point mountings. Quieter, easier riding, too.



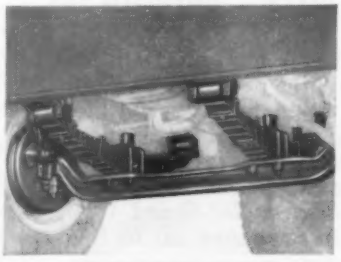
Save time, save money with the most powerful V-8's you can get—to 549 cu. in. Other power plants to 356 hp.



Easy to handle even in tightest spots with true geometric steering, cam and roller-mounted steering gears.



Plenty of strength for the toughest jobs and biggest loads with frames that have extra rigidity with proper flexibility.



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Tough on- and off-highway jobs require tandems and all other parts that are built to stand up and take it . . . that will keep operation and maintenance costs 'way down.

And that's the way INTERNATIONALS are built. Cost records prove* this all-important fact – INTERNATIONAL Trucks cost *least* to own.

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Why not follow the lead of men who know truck costs to the penny – men who have made INTERNATIONAL six-wheelers the sales leader for the past 22 straight years. Make your next truck an INTERNATIONAL.

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is this your wire rope problem?

LESCHEN wire rope experience solves this problem for you in "*Red-Strand*" Bulletin 101

SEND FOR YOUR COPY TODAY—You'll find this bulletin full of practical suggestions for minimizing the destructive effects of abrasion on wire rope you use. That means longer useful life, less down time, lower costs. These suggestions are in simple, non-technical language, easy to follow, yet technically sound...based on the same full century of rope making experience that insures consistent top quality in every foot of *Leschen Red-Strand Wire Rope*. So write for Bulletin 101 today. At the same time, ask for free engineering counsel on any other wire rope problem you may have experienced. Address: Leschen Wire Rope Division, H. K. Porter Company, Inc., 2727 Hamilton Avenue, St. Louis 12, Missouri.

LESCHEN
Red-Strand

H. K. PORTER COMPANY, INC.
LESCHEN WIRE ROPE DIVISION

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INDUSTRY NEWS

(Continued from page 64)

Second kiln installed at new lime plant

CHEMICAL LIME CO., Baker, Ore., has installed a second kiln alongside its 7½ x 150-ft. Vulcan rotary kiln which has been operating since the firm opened last October. Output from the 75,000-tpy. plant includes chemical grade lime, pulverized quicklime, regular and superfine hydrate and various other products.

Outcroppings and extensive exploratory drilling of the company's limestone deposit has indicated a proved reserve of 3,000,000 tons of high-calcium stone with an additional 3,000,000 tons indicated in the same area. A second deposit of equal quality is located 1½ miles east. The quarry face, which will eventually reach a height of 260 ft., is being developed on 20-ft. benches with Worthington wagon drills and millisecond-delay blasting procedures. Very little stripping is required.

Chemical Lime Co. is owned by Anthony Brandenthaler and Thomas W. Dant. Robert G. Vervaeke is general manager, Walter Taschek, general superintendent, and Raymond Fenn is chemist.

Gypsum mining begins

VERDE GYPSUM CO., INC., Phoenix, Ariz., formed in June, 1957, has completed mine installations and has begun shipments of agricultural gypsum to markets in Phoenix and Central Arizona. The firm was incorporated by Gordon R. and Gordon E. French and by Kenneth G. and Vincent F. Neils.

A separate company to haul gypsum from the mine has been formed by the Neils brothers. Sales management is under the direction of J. R. Scott.

Cement prices raised in some locations

AN INCREASE IN THE PRICE of cement became effective January 1 at a number of plants throughout the country, with raises generally amounting to 15 cents per bbl., or about five percent. Areas where prices have gone up are in the south, midwest, west coast and Rocky Mountain areas.

Ideal Cement Co. increased prices 15 cents per bbl. at two California plants and one in Nebraska, and 10 cents at plants in Colorado and Oklahoma. According to Cris Dobbins,

president, the increase is not covering the 35-cents-per-bbl. rise in costs resulting from higher fuel oil prices.

Penn-Dixie Cement Corp. announced that it was raising prices at seven of its ten plants; General Portland Cement Co. has posted a price rise at one of its southern plants and Universal-Atlas Cement Co. raised prices at five of its ten plants.

Marquette Cement Manufacturing Co. "followed the industry pattern" of 15-cent price hikes at five of its eight plants. Lone Star Cement Corp. was reported to have raised prices at its Lone Star, Va., plant; Lehigh Cement Co. at Iowa and Kansas plants; and Consolidated Cement Corp. at its Cement City, Mich., Paulding, Ohio and Fredonia, Kans. plants.

Higher wage and material costs are given as the main reasons for the raises. Several company officials said they will cover only cost increases incurred this past year, including wage boosts following settlement of last summer's strike. Prices before the latest increases ranged from $3.05 per bbl. in the south to $3.50 per bbl. in some Rocky Mountain areas.

Canadian cement makers study U.S. price hikes

CEMENT PRICES IN CANADA may go up, according to Toronto's *Financial Post*, following upon the heels of price rises in the United States. A number of Canadian producers reportedly were studying the possibility of increases, which would be the first general rise in five years.

Business was termed "brisk and growing" for Canada's cement industry. Total shipments in the first three-quarters of 1957 were 4,700,000 tons, up 22 percent from the 3,800,000 tons shipped in the corresponding period a year earlier. Some of the increase was attributed to high cement exports to the U. S. resulting from the strikes here last summer.

Installed capacity of Canada's cement industry at the beginning of this year were estimated to be about 40,000,000 bbl.

Ohio mineral extraction

THE MINERAL EXTRACTION INDUSTRY in Ohio added nearly $300 million to the wealth of the state in 1956, with coal accounting for about half the dollar value. The combined worth of the state's nonmetallic minerals—sand, gravel, sandstone, clay, salt, shale and gypsum, was $119,679,000. The payroll for nonmetallic mineral workers in Ohio in 1956 was $38 million.

(Continued on following page)

Where the going's rough,

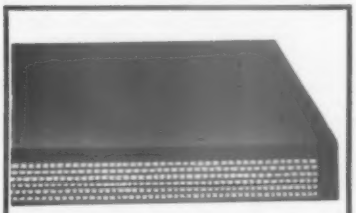
QUAKER CONVEYOR BELTING

can take the beating

For the roughest use, choose the toughest belting. When you're moving ores, limestone, gravel, bricks, and other sharp, jagged loads, choose a conveyor belting that's sure to stand the gaff day after day.

That's Quaker. The wide range of specialized Quaker Conveyor Belting styles includes flexibilities, degrees of puncture-resistance and tensile strength to meet every quarrying and construction requirement. And the four basic Quaker cover-and-internal-ply designs can be further modified to perform exactly as your needs dictate.

Get the full money-saving story from your Quaker industrial distributor, who can give you valuable assistance on *all* problems involving industrial rubber products.



Cross-section Quaker No. 1 grade conveyor belt. For toughest handling problems of almost every conveyor job. Mildew-inhibited. Available in duck, rayon duck, and cotton-nylon ducks. In all lengths, with any number of plies. In widths up to 72".

FREE CATALOG. Send for this illustrated Quaker Conveyor Belting Catalog. Write *Quaker Rubber Division, H. K. Porter Company, Inc.; Philadelphia 24, Pa., or Pittsburg, California.*

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

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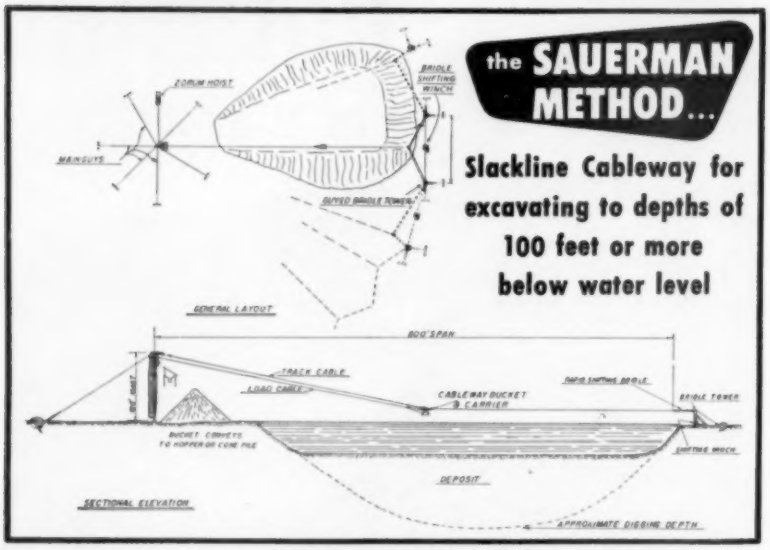
HOW TO GO UNDER WATER AND GET ALL THE MATERIAL FROM YOUR DEPOSIT



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.

Cableway at Cabinet Gorge Dam digs and hauls from tailrace 1000 ft. away. (Full details in Sauerman News No. 143.)

New York gravel producer switched to cableway for underwater operation of his pit. Average haul is 600 ft. from a 50-ft. depth (Sauerman News No. 141).

Deposits below water yield new profits with a long reaching Sauerman Slackline Cableway. On job after job this machine has proved to be the most efficient for this type of operation. It is especially effective where the material to be excavated has good depth and will flow to the bottom of the cut. For shallow deposits or non-caving material a rapid shifting device is used to change the line of operation.

One man controlling the hoist digs, conveys and elevates from deposit to plant over spans of 1000 ft. or more . . . across streams, lakes, bogs or deep pits. The powerful load line pull insures digging penetration. Tensioning the track cable lifts the bucket which is inhauled at high speed and dumps automatically. Gravity return completes the fast operating cycle. Bucket capacities range from ½ to 3½ cu. yds.

To get fast, economical long range excavation, and the shortest, most direct way from pit to pile use a slackline cableway. Contact Sauerman for specific recommendations. No obligation. Request Catalog C, showing detailed specifications and photos of slackline cableways in action on all types of deep digging jobs.

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630 S. 28th AVE. | BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

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INDUSTRY NEWS

(Continued from preceding page)

Sells pumice plants

WILLIAMSON CASCADE PUMICE CO., Bend, Ore., producer of lightweight aggregate and plaster sand, has been sold by Lloyd A. Williamson to Boise Cascade Corp., Boise, Idaho. The sale includes 3,000 acres of land with pumice or other volcanic deposits, two processing plants, open-pit mining equipment and rights to the sale and distribution of the aggregates for use in manufacturing lightweight concrete building material.

Under terms of the sale, Mr. Williamson will become president and general manager of a new corporation. The Boise firm owns several concrete products and ready-mix companies.

Recommend sales policies for sand, gravel industry

NATIONAL SAND AND GRAVEL ASSOCIATION, Munsey Building, Washington, D.C., as a service to its members has published a booklet, "Standard Clauses for Sales Agreements in the Sand and Gravel Industry." It presents the thinking of the industry about the use of printed forms limiting and specifying respective obligations of seller and purchaser.

A sample quotation form is included, as well as suggested general terms and conditions of sale. Charles E. Brady, Material Sales Co., Salisbury, N.C., served as chairman of the committee preparing the publication.

Slag-cement bulletin

S. A. CIMENTERIES & BRIQUETERIES REUNIES, Brussels, Belgium, has described its new portland blast-furnace slag cement in a six-page bulletin. Known as "Top Brand" cement, it is said to show comfortable margins over the tensile and compressive strength requirements of specifications such as ASTM 205-56T, BS 146; 1947, NFP 15-304, etc. Copies of the bulletin can be obtained from Indussa Corp., 511 Fifth Ave., New York 17, N.Y.

Sells plant, quarry

WYANDOTTE CHEMICALS CORP., Wyandotte, Mich., has sold its limestone plant and quarry at Alpena, Mich., to Huron Portland Cement Co., Detroit. The last shipment of limestone from Alpena to Wyandotte was made December 6. Now the quarry's entire output will go to the cement company's plant in Alpena.

(Continued on page 76)

Now . . . a New High in Dust Filter Efficiency . . .

New SLY "ROLL-CLEAN" Dynaclone

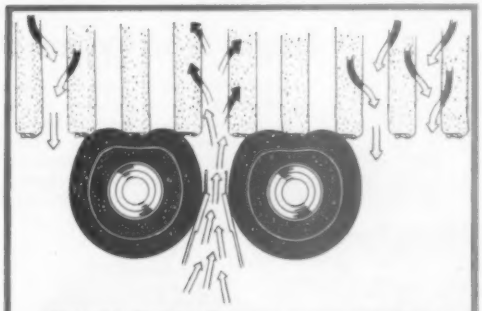
THESE NEW FIELD-PROVEN FEATURES

- Easier filter bag changing.
- Greater cloth area.
- Fewer operating parts.
- Free-rolling cleaner — no sliding.
- Complete dust seal — automatic seal adjustment.
- Easy access to all dust filter parts for inspection and servicing.

PLUS THESE TIME-TESTED DYNACLONE ADVANTAGES

- Constant suction at dust sources — complete dust collection.
- Self-cleaning for continuous operation.
- No auxiliary motors or blowers required for filter-bag cleaning.
- Greater filtering capacity and smaller space requirements — more cloth per cubic foot of filter than any other make.
- Lower power requirements.

The original self-cleaning dust filter, the Dynaclone has proven itself the most efficient dust filter ever made. The "Roll-Clean" Dynaclone combines design simplicity and rugged construction to insure even greater operating efficiency . . . even longer trouble-free service.



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

NEW CATALOG
36-page Bulletin 104 gives full details about "Roll-Clean" Dynaclone and other Sly Filters . . . contains valuable engineering information. Write for copy.

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OFFICES IN PRINCIPAL CITIES

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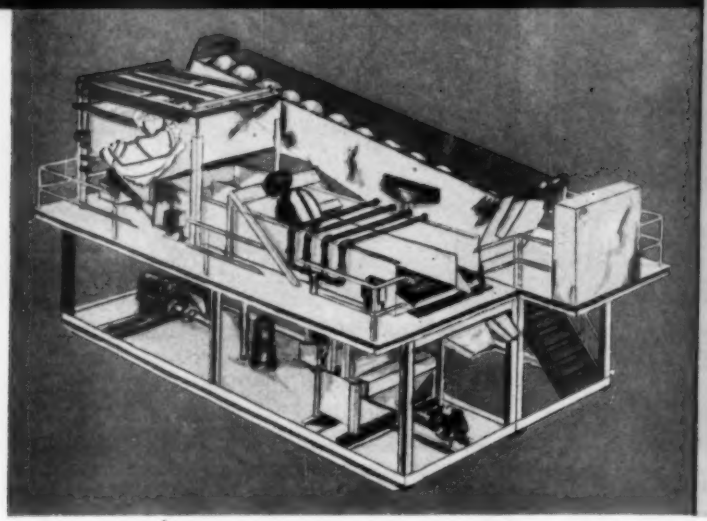
You can't beat

and EAGLE IRON WORKS

has the *experience* . . .



This *NEW* EAGLE AGGREGATE PROCESSING EQUIPMENT

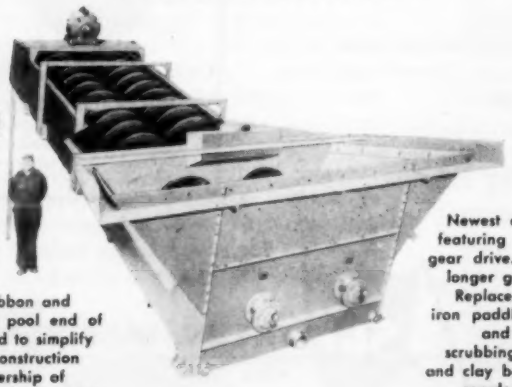
WILL ENABLE YOU TO MEET SPECIFICATIONS . . . INCREASE YOUR PROFITS!

↑ Eagle heavy media separation plant

An efficient unit for sand and gravel or crushed stone producers with separation problems that can not be solved by the usual methods. Pre-assembled at factory into four easily connected units. Quickly set up. Transportable in four block sections. Employs screw densifier of Eagle design and use of other proven auxiliary equipment. Requires no below-ground concrete sump. Assures best separation through most productive pool area provided by OCC Separatory vessel.

Eagle screw washers → with new features!

Eagle Single Screw and Double Screw Fine Material Washer-Classifier-Dehydrators always outstanding for performance now feature Improved gear drive, Velocity-killing feed box that reduces turbulence by introducing fine material at critical point in a flat ribbon and Removable, gasketed side flares at pool end of tub which can be removed for travel and to simplify installation. *Plus* all the design and construction features that have maintained the leadership of both Eagle Fine Material and Coarse Material Screws for so many years.



Eagle log washer with compound drive →

Newest and most productive log washer, featuring positive, power-conserving, compound gear drive. No stalling under heaviest loads, longer gear life. Non-deflecting tubular shaft. Replaceable Ni-Hard nickel-chromium alloy iron paddle shoes. Gravel, crushed stone and ore get a thorough abrading and scrubbing to break up and wash out soft stone and clay balls. Also breaks down cemented conglomerates or gooey material.

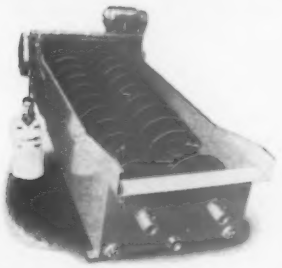
experience !

86 years of it

Eagle pioneered the design and construction of screw washer-classifiers-dehydrators, early recognizing the need for separate units of different design to handle fine materials and coarse materials. *Experience* through the years dictated improvements until the present modern design was achieved. There is no finer, more efficient washer built.

In recent years Eagle pioneered the water scalping-classifying tank to further enable producers to meet specifications. Here again, *experience* has given the industry outstanding design.

Eagle builds the most complete line . . . Eagle has a well qualified sales and service organization . . . large engineering staff, pilot aggregate plant and testing laboratory to help solve your problems . . . 46% of Eagle Equipment sales are repeat sales . . . you can bank on Eagle experience.

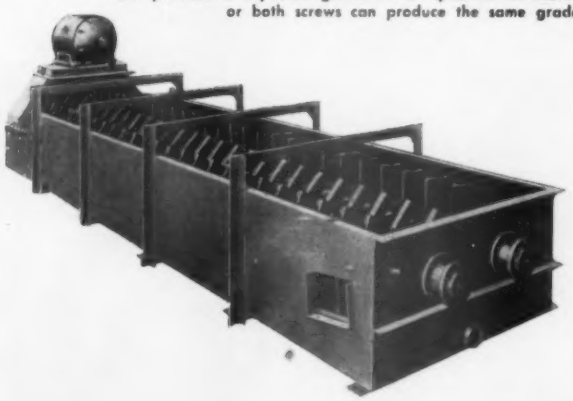


Eagle coarse material washer-dewaterer

Washes and dewaters material up to 2½" sizing; 25 to 350-tons per hour. Paddles between the lower screw flights loosen up incoming material. New, positive, totally enclosed gear drive runs in oil bath.

↑ Eagle portable washing-classifying-dehydrating section

Another Eagle "first". Provides mobility from pit site to pit site. A complete fine material washing-classifying-dehydrating unit with standard water scalping-classifying tank equipped with automatic bleeder valves, metering "splitter" gates and three cell collecting-blending flume mounted above two single screw washer-classifier-dehydrators. Each screw can produce a separate gradation of specification material or both screws can produce the same gradation.



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EAGLE IRON WORKS

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TD-24 "strips" at lowest of any crawler on the

reports Morris Enterprises, Owensboro, Kentucky

Upgrade, downgrade, or on the level, famous Planet Power steering gives you positive and constant load control on turn or straightaway. And this planetary system that gives full-time "live" power on both tracks lets the TD-24 pull the same big loads on turns as on straightaways! Morris Enterprises owns this TD-24 that's stripping overburden near Knottsville, Ky.

Benching or 'dozing around curves is a cinch for the TD-24. TD-24 two-track turning power never backs off from the load—and does not let the load "fish-tail" the tractor or slip the tracks! Instead you "feed" power to both tracks to keep the full productive push where you want it!

cost per cu yd market...

On this stripping operation near Knottsville, Kentucky, Morris Enterprises are moving a maximum of 45 feet of overburden—to uncover a 42-inch coal seam. Overburden is a 5 to 10-foot earth layer; the balance, shale and soapstone.

An International TD-24 dozer is moving 50% of the overburden on a 60 to 70-foot wide cut ahead of shovel operation. A 3½-cu. yd. shovel moves the other 50%.

"This kind of performance sold me"

"Have been using International TD-24's since 1950," reports P. H. Morris, for Morris Enterprises. "The TD-24 has proven able to move dirt cheaper per cu. yd. than any other track-type tractor. Upkeep has been low and TD-24 ease of operation enables the operator to maintain full production—after hours of continuous dozing.

"Live power on both tracks while turning is a definite advantage for full load maneuverability. And shifting on-the-go speeds up the production.

"One of the TD-24's ran 7,500 hours before major overhaul on rails, shoes, and engine. Still in use with original rollers and sprockets.

"This kind of performance sold me on TD-24's for my operation."

See how you 'doze bonus yardage on the turns—stay "on course" with offset loads—keep positive load control, upgrade or down, with TD-24 Planet Power steering to eliminate "dead-track drag." Prove the cycle-speeding advantages of exclusive Hi-Lo shifting—for adjusting the speed to the load—for gaining capacity-adding reverse speed on shuttle dozing. Compare International's Cerametallic-faced engine clutch—for power-transfer efficiency—operating and servicing ease—long life! See your International Construction Equipment Distributor for a TD-24 demonstration!

International® Construction Equipment

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

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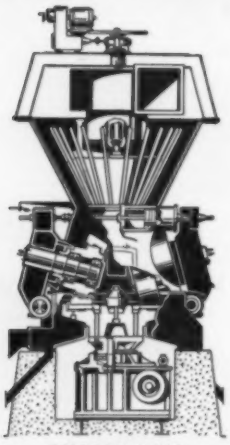
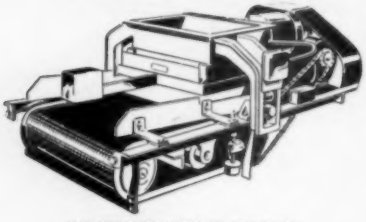
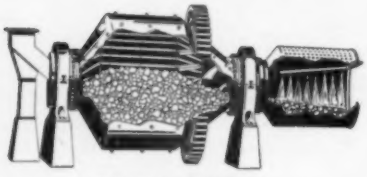


DISC-ROLL MILLS

CONICAL AND TRICONE MILLS

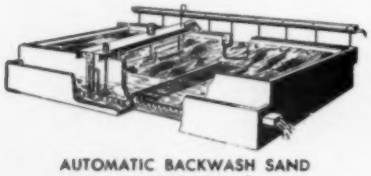


CONSTANT-WEIGHT FEEDERS

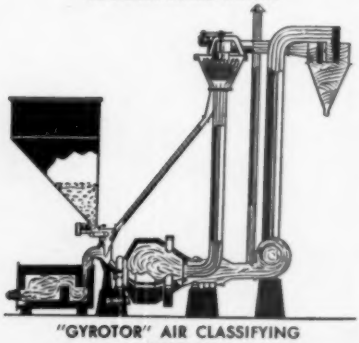


CONICAL SCRUBBERS

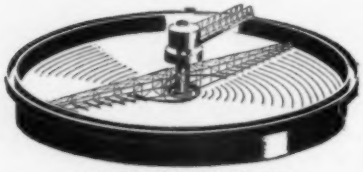
RUGGLES-COLES DRYERS



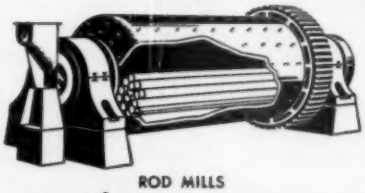
AUTOMATIC BACKWASH SAND FILTERS



"GYROTOR" AIR CLASSIFYING SYSTEMS

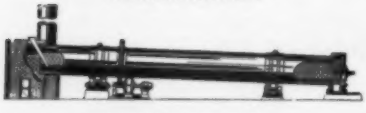


"AUTO-RAISE" THICKENERS



ROD MILLS

HYDRO-CLASSIFIERS



RUGGLES-COLES KILNS

RUGGLES-COLES COOLERS

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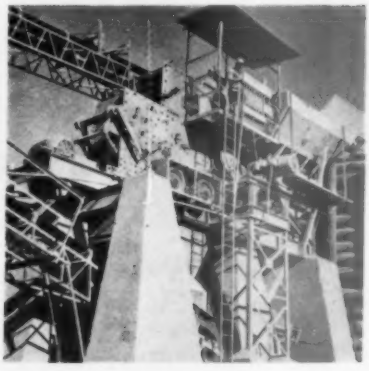
INDUSTRY NEWS

(Continued from page 70)



Coal company ventures into aggregates production

MULLET COAL CO., Mount Eaton, Ohio, has gone into production of aggregates with a new plant designed and installed by Aggregates Equipment, Inc., Lancaster, Pa. Removing unwanted dirt and fines from the shot limestone has been accomplished by a Universal Wobbler Feeder ahead of a Universal 3645 Impact Master. In closed circuit with a screening tower, the plant handles 200 tph.

Between the coal and the 4-ft. layer of limestone is an intermediate layer of clay, dirt and mud. This material mixes with the limestone when shot to form a dirty compound, containing as much as 30 percent of objectionable fines.

Pictured here, the feeder-crusher combination is seen with a view of the operator's platform. The crusher is skid-mounted on a steel frame over concrete supports.

Best safety record

THE BELL MINE of Warner Co., Bellefonte Div., Bellefonte, Pa., had the best safety record of the plants enrolled in the 1956 National Crushed Stone Association Safety Competition. The mine operated 277,540 man-hours throughout 1956 without a lost-time injury. This was the third year in succession that the Bell mine has taken the winner's bronze plaque.

Second place was awarded to the New York Trap Rock Corp.'s Tomkins Cove limestone quarry, operating 272,097 man-hours without a disabling injury; third place to Bessemer Limestone and Cement Co.'s Bessemer, Pa., limestone quarry, with 227,152 man-hours of injury-free operation; and fourth to Columbia Quarry Co.'s Columbia, Ill., No. 1 limestone quarry, with 200,052 man-hours.

(Continued on page 78)

Enter 1086 on Reader Card

"95" Payhauler® beats trailer units by up to 50 seconds... *in 20% grade climb-outs!*

Phosphate mine superintendent reports "95" gains up to 100 cu. yd. daily!

A bonus-powered International "95" Payhauler®, in carefully timed tests, climbed the winding 20% grade, up to 50 seconds faster than competitive crawler-pushed trailer units!

The Payhauler, and the two "articulated" hauling units, bring out 18 cu. yd. loads apiece at the Simplot Corporation's phosphate rock mining operation near Blackfoot, Idaho.

Supt. Robert Bulard reports: "The Payhauler gains approximately 100 cu. yd. daily over our other 18 cu. yd. haul units. Not only does it have greater speed, but the Torqmatic braking gives it greater safety as well. This morning, light rain made pit roads so slippery all equipment quit except the Payhauler. It never missed a load."

Power on Payhauler rear wheels delivers top operating efficiency on steep grades or under "slick" conditions where trailer units bog down completely. Prove the fast get-away surge, the extra climbing power, and up to 25% faster haul speed of an International Payhauler. That's the exclusive result of bonus turbo-charged diesel power; road-matched and load-matched gear choice; and the power-cushioning leverage of planetary drive axles!

Try Payhauler "pick-up truck" spotting ease. Exclusive high reverse speed, "zip-around" power steering, and grade-beating power get the credit! See how 12-second dumping with double-acting hydraulic hoist speeds the cycle. See your International Construction Equipment Distributor for a Payhauler demonstration.

International Harvester Co.
180 N. Michigan, Chicago 1, Ill.

Gentlemen:

☐ I am a contractor. ☐ Am an equipment operator (please check square that applies). Send me Payhauler Catalog (CR-603-G).

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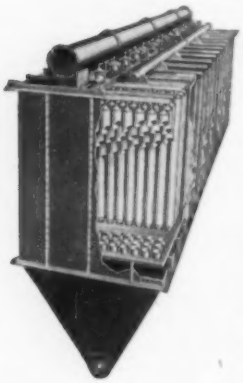
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Norblo solves dust problems

Whatever you need in dust or fume control, be sure to check *Norblo*

In Bag Type, Centrifugal or Hydraulic dust collecting systems, Norblo Dust and Fume collection equipment has many design advantages. These three types, frequently used in certain combinations, provide economical dependable control as required in smelting, rock products, chemical, milling and processing fields.

What is the best approach to your dust problems? Norblo helps you select—applies engineering skill and "know how" gained in first hand experience of over 40 years in many industries.



Norblo Bag Type Systems

Automatic and Standard

For continuous or heavy duty service providing very high efficiency at very low cost of operation and maintenance. Basic unit contains 78 bags, 6″ diameter, 8′ 3″ long. Air flow is upward, from inside, thus keeping bags fully distended. Total free cloth area per compartment 936 square feet. Shaking and cleaning controlled by electric timer, is cyclic, one compartment at a time, each having its individual compressed air shaker mechanism and the whole system variable and adjustable for dust load without shutting down . . . Also Norblo Standard Bag Type (non-automatic).

Norblo H. E. L. S. Centrifugal Systems

A cyclone or centrifugal type collector for all materials, from sawdust to fly ash; characterized by high efficiency of collection with low static drop. The Norblo H. E. L. S. has no internal vanes, gadgets or dampers. High efficiency is obtained by scientific proportioning and by the patented (No. 2,259,919) expanding nozzle. These design features eliminate the power-wasting back eddy. Built in standard sizes with capacity up to 37,500 cfm.

Norblo Hydraulic Systems

A high efficiency, wet type collector, for separation of dust mixed with smoke or fumes. In most installations the Hydraulic unit is used with a Norblo Cyclone collector, thus reducing the amount of wet sludge to be handled. No moving parts. Filter beds are coke or high-fired ceramic tubes, light weight and kept in motion by ascending air stream. Beds are self-cleaning. Built in standard sizes with capacities up to 26,000 cfm.

Take advantage of the efficiency and low maintenance available through Norblo Equipment in these three proved systems of dust and fume collection. Write for full information.

The Northern Blower Company

6408 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300

Norblo ENGINEERED DUST COLLECTION SYSTEMS FOR ALL INDUSTRIES

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INDUSTRY NEWS

(Continued from page 76)

Safety record merits ROCK PRODUCTS trophy

G. & W. H. CORSON, INC., Plymouth Meeting, Pa., was presented the ROCK PRODUCTS safety trophy emblematic of top honors in the Class A-1 Division of the National Lime Association safety competition, conducted by the U. S. Bureau of Mines. Wardner J. Nice, plant superintendent, at left, accepted the trophy for the company from George C. Lindsay, at right, ROCK PRODUCTS editor. Shown with them are Philip L. Corson, chairman of the board, Bolton L. Corson, president and Carroll L. Corson, executive vice president.

The Corson company and its employes earned this recognition for working 355,680 man-hours in 1956 with no lost-time injuries. In making the presentation, Mr. Lindsay commented that competition for the award was exceptionally keen this year and the number of "injury" accidents among companies in the contest was the lowest since competition started in 1935.

Mr. Lindsay complimented the employes and management on setting such a fine safety record, stating that the entire industry pointed its finger to the plant as the country's example in operating safety. Evidently the record was achieved through close cooperation between management and employes—teamwork. Based on the accident-free man hours experienced by the plant in the contest period, it would have taken one man 171 years to achieve the record by himself. He asserted that safety is always an uphill road, but the Plymouth Meeting plant proved that accidents can be prevented if everyone works as a team.

•

OKOMA SAND CO., Tulsa, Okla., with capital stock of $20,000, was chartered recently. Incorporators are Clyde B. Fisher, Paul Cox and B. E. Riese.

(Continued on page 80)

Enter 1122 on Reader Card

Stop paying a partial production penalty with pooped-out power

Call an International replacement engine specialist for new production-boosting, cost-cutting power

When the engines in your powered equipment are beyond the reasonable repair stage, you start paying a heavy down time and lost production penalty every day you keep them on the job.

That's the time to call in a repower specialist – your nearby International Power Unit Distributor or Dealer. Here's how he can help restore original equipment production:

- Expert analysis made on the job with replacement power check charts.
- Assistance, when required, from International repower engineers.
- Closely matched power from a dependable, economical diesel or carbureted engine in the International line. No under-powering, no need to buy excessive horsepower.
- Fast installation, when desired, and exceptional after-sale service backed with a complete parts stock and always-available service facilities.

Call him in and get his estimate on your next repower job. You'll like production-boosting International power and the service support you get from the man who sells it.

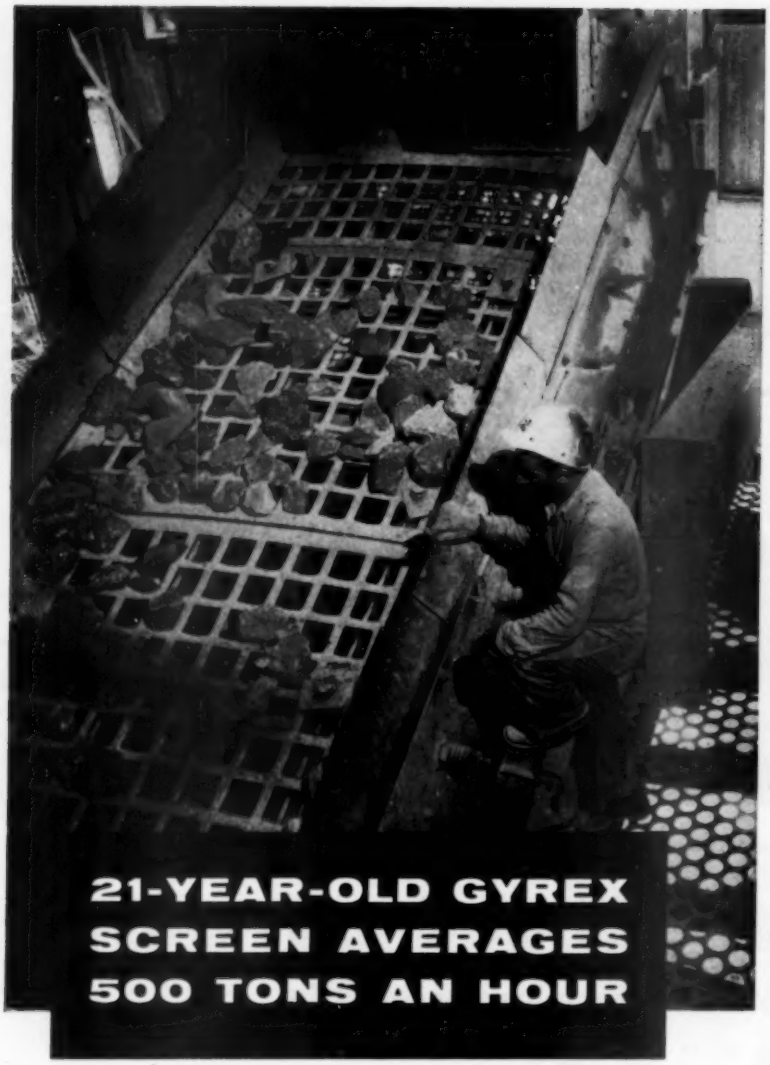
Smooth-performing UD-350 diesel power unit with gear type balancer is but one of 20 dependable, economical repower choices available in the International line. Power range: 16.5 to 250 net hp with your choice of fuel.

International®

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois

Construction Equipment

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.



21-YEAR-OLD GYREX SCREEN AVERAGES 500 TONS AN HOUR

The Marble Cliff Quarries Company, Columbus, Ohio, separates 500 tons of stone an hour on a Hewitt-Robins Screen. This double-deck Gyrex vibrating unit was installed in 1936 and still has its original eccentric bearings. Main bearings were replaced only once—in 1953 after 17 years of use.

The low upkeep, design flexibility, and high over-the-years productivity of this H-R unit led Marble Cliff Quarries to install a second screen of identical capacity in 1948. And today both units still operate nine hours a day. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS... POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE... VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

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INDUSTRY NEWS

(Continued from page 78)

A reader comments . . .

November 6, 1957

Dear Sir,

MY ATTENTION has been called to a serial essay in your issues of June and July, 1957, on improvements regarding ball mill efficiency as ascribed to the research work of a European team headed by G. J. Halbart. (Ed. note: see "Ball mill efficiency can be improved," June, 1957, p. 157 ff., July, 1957, p. 105 ff. Series concluded in January, 1958, p. 151 ff.)

Authors admit having tried to follow the paths of previous knowledge, and certainly present their subject matter in a challenging form.

However, the object they pursue of creating an ordered array among the balls constituting a mill load, was very precisely described about 15 years ago, and has been industrially proved with a marked degree of success—please refer, for example, to Bellwinkel, in *Zement Kalk Gips* Vol. 6, No. 12 (1953) pages 439-444.

As they gain experience in the field they are just beginning to explore, authors will probably be led to revise their now somewhat unqualified opinion on the relative values of Davis' and Uggla theories of mill load equilibrium shapes: instead of choosing now Davis, then Uggla form, they will find that a strict combination of both is imperative, Uggla applying in those regions where frictional forces (not considered by Davis) are predominant, whilst the Davis shapes must be valid when directly applied forces command the arrangement. Also, their very simple deduction of Uggla curve—which we heard several years ago from Mr. Garnir, of Liege University—is essentially based on some work done about 1948 by different workers, and wherein the Uggla curve was demonstrated to be the equiangular trajectory of a family of circles, centred at $\frac{g}{\sim 2}$ above axis of mill.

This truly scientific approach of the subject, and its far-reaching implications, will probably be found most accessible to the English-speaking reader in a book from a well-known British authority, to be published in London (Constable & Co.) about end of this year.

Yours truly,

P. Fobelets
Chief Design Engineer
Usines Emile Henricot
Court-Saint-Etienne
Belgium

(Continued on page 82)

Enter 1161 on Reader Card

Here's your answer to tough digging and hard loading!

Doubling for dynamite, this 4-In-1 is digging and loading "unshot" sandstone material for binder and fill. Holland and Woodward Stone-Gravel Trucking Co., Decatur, Alabama, reports this material formerly had to be "shot"—before previously-used equipment could handle it!

Multiply your job range.... by FOUR
Divide your rig investment by FOUR!

Instead of sinking your capital in an old-fashioned "single-action" loader, let the same money buy four big-capacity International Drott 4-In-1 machine actions!

Instead of allowing profits to dwindle because an ordinary tractor-loader can't do 'dozer, scraper, or clamshell work, change to a 4-In-1! Move the machine-selector lever, right from the comfortable foam rubber seat, and watch your profit-building potential go up and up!

You aren't getting just "another bucket"—but famous and exclusive Skid-Shovel® rock-busting, pry-action break-out. And 41° bucket-heaping, ground-level roll-back. It's the one and only true pry-action! That means full hydraulic power transfer—correct pry-lever length—and exclusive frame-mounted skid-shoes to provide the vital fixed fulcrum!

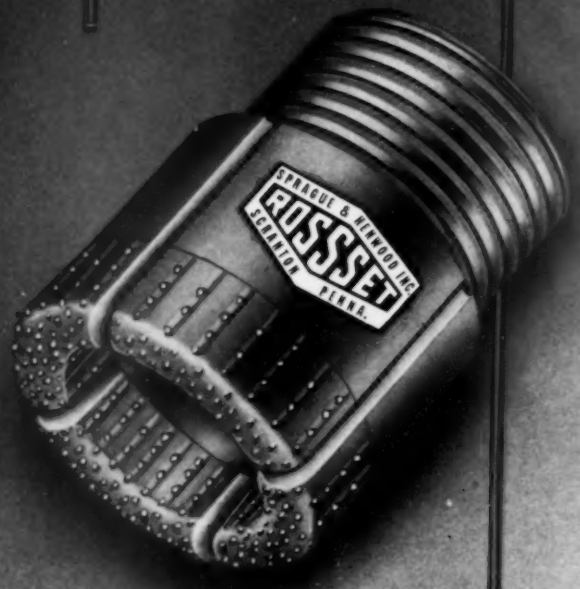
And you're also getting easily-controlled, earth-rolling bulldozer action. Plus "carry-type scraper" action to grade, strip, or spread with inch-close accuracy. Plus super-speedy clamshell action, with bottom-dumping to eliminate the sticky materials problem. Plus the exclusive performance protection of shock-swallowing Hydro-Spring!

Invest only 15 boulder-bucking, earth-rolling, load-gulping, sod-stripping minutes! Prove to yourself that an International Drott 4-In-1 multiplies your job range, and divides your investment, by four! Prove you can't afford to handicap your future with any limited-duty rig—when you command this versatility unlimited. See your International Drott Distributor for a 4-In-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

THERE IS THE RIGHT BIT FOR YOU... OUT OF A POSSIBLE COMBINATION OF THOUSANDS OF SIZES AND TYPES



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Based upon over 70 years of world-wide drilling experience, we have the right bit to use to obtain the best possible cores at the lowest cost per foot. Out of the many combinations possible with the four matrices, several stone size ranges, three grades of diamonds, and various face contours, there is the one "Oriented" Diamond Bit you want for the job you have to do.

Write today, giving all information you can provide. We will be glad to recommend the bit we believe to be the best suited to your drilling conditions. Always order or specify SPRAGUE & HENWOOD "Oriented" Diamond Bits. For the complete diamond bit story, write for our Diamond Bit Catalog No. 320-1.

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INDUSTRY NEWS

(Continued from page 80)

Tax official tells stand on expense account data

COMMISSIONER OF INTERNAL Revenue, Russell C. Harrington, has made the following statement exempting taxpayers from including additional expense account data in preparing their 1957 returns:

"Taxpayers will not be required to answer line 6(a) of the 1957 individual income tax return Form 1040, and, thus, employes will treat travel, reimbursed expenses, etc., for 1957 as they have in the past. All Internal Revenue offices are being so informed.

"This action is taken because the decision to include a new line in the 1957 income tax return Form 1040 was not made public until ten months of the tax year had passed, and hence had a retroactive effect.

"Taxpayers have emphasized to the Service that most employes who receive reimbursements for expenses file bills and receipts with their employers and do not retain copies. To attempt now to secure data would place too great a burden on many taxpayers.

"This decision does not change the long-standing rules which the Revenue Service has been following with respect to substantiation of deductions when a taxpayer's return is audited.

"For the year 1958, all individual taxpayers who incur expenses in connection with their employment should keep adequate records of their expenditures and reimbursements so that for 1958 and later years they will be in a position to supply expense account information from their own personal records."

NISA adopts employe retirement program

NATIONAL INDUSTRIAL SAND ASSOCIATION, Washington 4, D.C., has accepted the invitation of the Retirement Plan Committee of National Sand and Gravel and National Ready Mixed Concrete Associations to bring its members under the NSGA-NRMCA retirement plan. Rewording of the Retirement Trust has been accomplished to permit NISA participation.

The purpose of the trust is to provide for the administration on a "pooled plan" basis of Treasury-approved pension and profit-sharing retirement plans now in existence, or hereafter created by any member company. Employers belonging to other associations may become participants upon approval by the Retirement Plan Committee.

(Continued on page 84)

CAST BUCKETS are also available in longer-lasting Promal for longer life under severe abrasive conditions

Select your cast elevator bucket from

LINK-BELT's complete long-life line

Greater efficiency . . . longer bucket life . . . fewer shutdowns—you get all these benefits when you choose the Link-Belt cast bucket that matches your elevator and the materials you handle. They're available in six styles—each in a full range of sizes to meet capacity requirements.

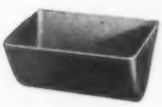
Smooth surfaces, well-rounded corners and proper proportioning assure quick filling . . . fast, clean discharge. In addition, Link-Belt buckets are cast from high-grade malleable iron . . . reinforced at points of greatest stress to resist wear and distortion. For facts on the type and size that's best for your operation, see your Link-Belt office or authorized stock-carrying distributor. Or write for your copy of Book 2465.

LINK-BELT

CAST ELEVATOR BUCKETS

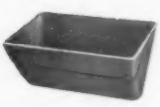
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.728

STYLE A



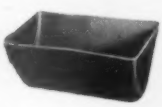
This type is used on elevators handling coal, cement, chemicals and similar materials.

STYLE AA



Designed to handle same materials as Style A buckets. Has reinforced lip for added wear life.

STYLE AA-RB
(Reinforced Back)

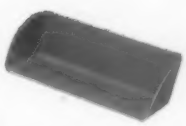


Elevate same types of materials as Style AA buckets. Designed for extra-heavy service conditions.

STYLE B

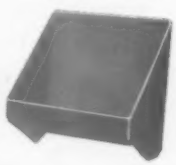
These buckets are used extensively for handling coke, ores, stone and similarly coarse materials.

STYLE C



Designed for handling clay, salt, finely pulverized ores, and other sticky materials.

CONTINUOUS



Used for clean, gentle handling of coal, sand, gravel, crushed stone and other dry materials.

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4 BIG REASONS WHY

Hanco ELECTRIC SCREEN HEATERS serve best in American Industry

1 • ELIMINATE BLINDING
2 • INCREASE TONNAGE
3 • BUILD GREATER PROFITS
4 • SPEED PRODUCTION

We welcome your inquiries. Be sure to include materials for screening and equipment in use. Hannon engineers will make recommendations which will *increase* your production and *reduce* your screening costs. Data sheets available without obligation.

PIONEERS IN ELECTRIC SCREEN HEATING

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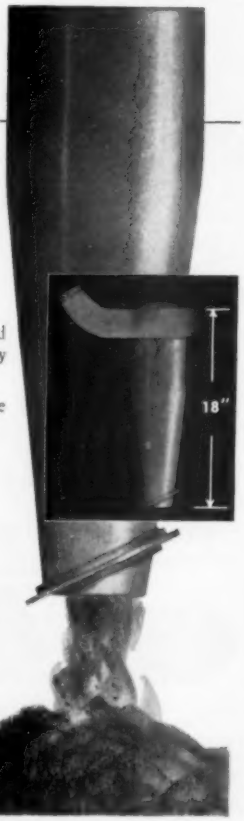
new, improved **DUSTEX COLLECTOR**

solves more recovery problems...costs less to install...



A major design improvement on the widely used and highly regarded DUSTEX Collector assures you efficiency —*superior to collectors costing much more.*

ALL NEW TUBE DESIGN—Longer, larger cast tube produces the following results...

- **Greater capacity with less air flow resistance**
- **Higher abrasion resistance**
- **Ability to handle inherently sticky materials**
- **Self-cleaning action**
- **Highest efficiency ever—at lowest cost**

ALREADY PROVEN in numerous field tests on the most difficult dusts, the new improved DUSTEX Collector is ready to go to work for you now. Write for descriptive literature and details today.

DUSTEX CORP. P.O. Box 2520 • Buffalo 25, N. Y.

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INDUSTRY NEWS

(Continued from page 82)

Employ fluidized system in rock calcination

TWO NEW PHOSPHATE ROCK PLANTS in Idaho and Wyoming are installing Dorrco FluoSolids systems to calcine the rock in fertilizer production. Presently under construction, the Georgetown, Idaho, plant of Central Farmers Fertilizer Co. will employ a fluidized system to handle 25 tons of phosphate rock per hour. Organic materials which interfere with processing steps later in the flowsheet will be burned off in this operation.

The second company, San Francisco Chemical Co., has purchased a two-reactor FluoSolids system to calcine 1,000 tpd. of phosphate rock at its Leefe, Wyo., plant. Operating in parallel at 6,300 ft. elevation, each reactor will be capable of roasting a maximum of 25 tph. of very abrasive and sticky feed material.

Jamaica gives Harvey bauxite concession

HARVEY ALUMINUM DIVISION of Harvey Machine Co., Los Angeles, Calif., has entered into a two-year agreement with the Jamaican government, giving the company license to prospect for bauxite on the 600 square miles of land the government owns.

Harvey's materials needs for its aluminum plant in The Dalles, Ore., amount to 300,000 tons per year. It has a five-year agreement with Japan to receive alumina from that country for the plant, which is scheduled for operation soon. At the end of this period, the company hopes to have found enough bauxite in Jamaica to supply its needs.

Sells million barrels

PERMANENTE CEMENT CO., Oakland, Calif., achieved record sales in October, it was announced by Wallace A. Marsh, vice president and general manager. For the first time in the company's history, more than 1,000,000 barrels of cement were sold in one month. The company's two plants, at Permanente and Lucerne Valley, Calif., have a combined annual production capacity of 11,000,000 bbl.

Kaiser Gypsum Co., a wholly owned subsidiary, reported that its gypsum division recorded a substantial sales increase in October over the previous year, and the insulating products division sent the firm's overall sales volume to a new record high.

(Continued on page 86)

MR. COURTNEY says:

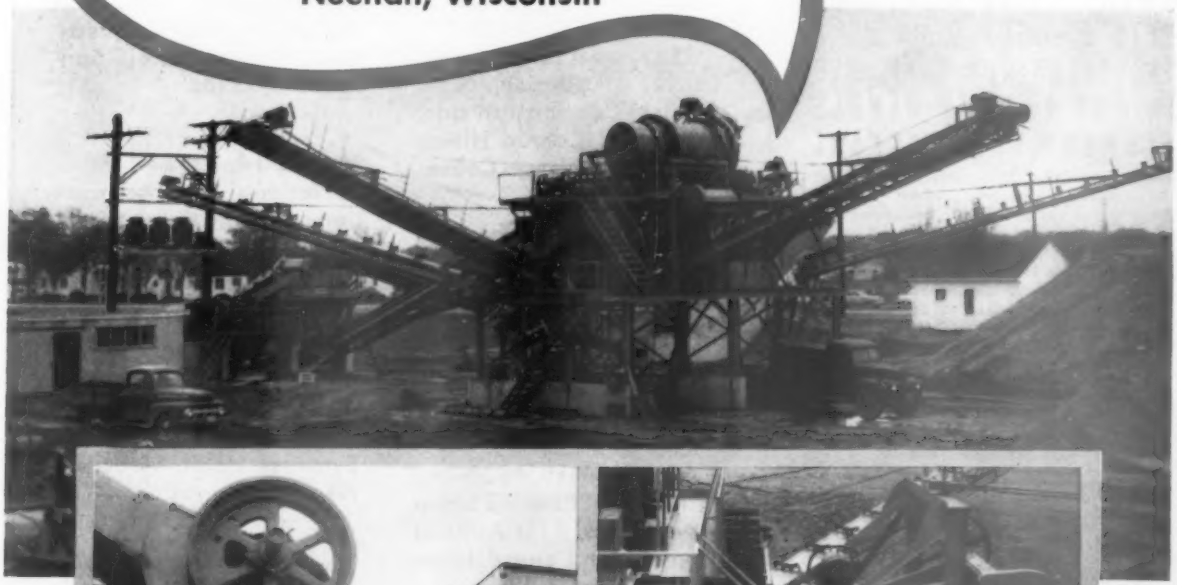
"We are washing material that we have never been able to wash before."

Courtney & Plummer had a pit problem — how to remove clay and dirt. Oversize gravel is crushed by a 10 x 30 Telsmith Jaw Crusher; then all sand and gravel goes to the 72" Telsmith Super-Scrubber. Its high speed, terrific impact and grinding action scrubs the aggregate *clean*. Plant capacity is 125-150 tons hourly of concrete and mason sand, and minus 1½" plus 1", minus 1" plus 7/16", minus 7/16" plus ¼" gravel. For over 20 years Courtney & Plummer have used Telsmith equipment in various operations. All new equipment in their new plant is Telsmith. Get Bulletin 266.

TELSMITH®

72" Super-Scrubber

handles all sand and gravel at new plant of COURTNEY & PLUMMER Neenah, Wisconsin



A Telsmith 10 x 30 Jaw Crusher reduces oversize gravel. A Telsmith 4' x 10' Double Deck Pulsator sizes aggregate from Telsmith Super-Scrubber and a 24" x 19' Telsmith Twin Screw Classifier recovers the sand.

G-28

SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

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NEW FOR YOUR CONVENIENCE...

FLEXCO

"25-PAK"

TWENTY-FIVE COMPLETE SETS OF FLEXCO HD BELT FASTENERS NOW AVAILABLE IN ONE EASY-TO-HANDLE ECONOMY BULK PACKAGE

There's no need now to carry several 10-set boxes to the job—every "25-PAK" contains 25 complete sets of FLEXCO Fasteners (bottom plates, top plates, clips, nuts and bolts) . . . enough FLEXCO Fasteners to join common belt widths (for example: one "25-PAK" box, size 1½E, will join a 36" belt.) Our savings from bulk-packaging are passed on to you!
Label on each "25-PAK" box has chart indicating the number of FLEXCO HD Fasteners to use for given belt widths.

Standard shipping carton contains four "25-PAK" boxes of one size fastener. Keep a supply of "25-PAKS" on hand. Easy to store and inventory, sturdy boxes and shipping cartons have many uses.

Ask your FLEXCO distributor or write to us for additional information.

Flexible STEEL LACING COMPANY

4684 LEXINGTON ST. • CHICAGO 44, ILL.
FOR THE SPLICE OF A LIFETIME

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INDUSTRY NEWS

(Continued from page 84)

Seeks mining rights

HAGERSVILLE GYPSUM AND ALABASTINE CO., Hagersville, Ontario, Canada, has offered $50,000 to the Six Nations Indian Reservation for mining rights to 500 acres of its land. A large deposit of gypsum is believed to be on the property.

Moves aglime operation

H. U. WINDSOR CO., King City, Mo., moved its agricultural limestone crushing plant to West Plains, Mo. The firm set up operations on quarry property which has been leased from Earl Hergesheimer.

Portland cement production

PRODUCTION OF FINISHED PORTLAND CEMENT in September, 1957, as reported by the Bureau of Mines, totaled 30,884,000 bbl., an increase of eight percent over September, 1956. Mill shipments for the month were 30,511,000 bbl., up two percent. Stocks of 20,195,000 bbl. of finished portland cement on hand September 30, 1957 were 30 percent greater than those on hand a year earlier. Clinker production during September, 1957 totaled 28,112,000 bbl., up three percent from the September, 1956, figure.

The output of finished cement came from 163 plants in 37 states and Puerto Rico. During the same period of 1956, 28,643,000 bbl. of finished cement were produced.

END

Coming Conventions

February 10-13, 1958—
National Sand and Gravel Association, 42nd Annual Convention and Exposition, Conrad Hilton Hotel and Chicago Coliseum, Chicago, Ill.

February 10-14, 1958—
American Society for Testing Materials, Committee Week, Hotel Statler, St. Louis, Mo.

February 17-19, 1958—
National Crushed Stone Association, 41st Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

March 5-6, 1958—
Iowa Agricultural Limestone Association, Inc., 13th Annual Convention, Savery Hotel, Des Moines

April 11-12, 1958—
Texas Aggregates Association, Annual Convention, Gunter Hotel, San Antonio, Texas

May 12-14, 1958—
National Lime Association, Annual Convention, Grand Hotel, Point Clear, Alabama

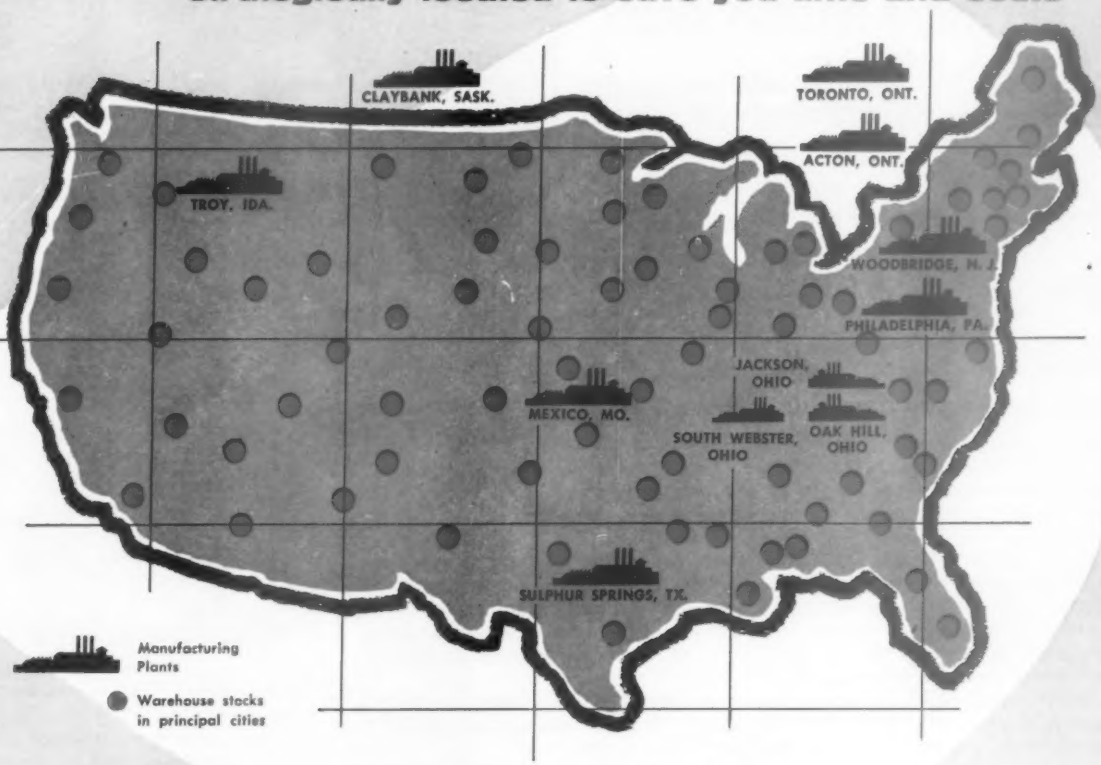
May 11-13, 1958—
Empire State Sand, Gravel and Ready Mix Association, Annual Meeting, Syracuse Hotel, Syracuse, New York

June 22-27, 1958—
American Society for Testing Materials, 61st Annual Meeting and Exhibit, Hotel Statler, Boston, Mass.

September 17-21, 1958—
National Sand and Gravel Association, Semi-Annual Meeting, Board of Directors, Sun Valley Lodge, Sun Valley, Idaho

A. P. Green
REFRACTORY PRODUCTS

manufacturing and warehouse facilities strategically located to save you time and costs



11 A. P. Green manufacturing plants and warehouse stocks conveniently located throughout the United States and Canada, Save You Money 7 Ways.

- **Lower Shipping Costs . . . from nearby manufacturing or warehouse point.**
- **Lower Capital Investment . . . your capital is not tied up in warehouse space.**
- **Lower Inventory Costs . . . you need inventory only for *immediate* needs.**
- **Lower Inventory Losses . . . buy on current prices . . . less breakage while in storage.**
- **Increase Production Space . . . free storage space for profitable production.**
- **Lower Labor Costs . . . deliveries to point of usage . . . no inplant moving of stocks.**
- **Maintain Steady Production . . . reduce down time waiting for materials.**

Your A. P. Green Distributor is Listed In The Yellow Pages of Your Telephone Directory, or write:

A. P. GREEN FIRE BRICK COMPANY
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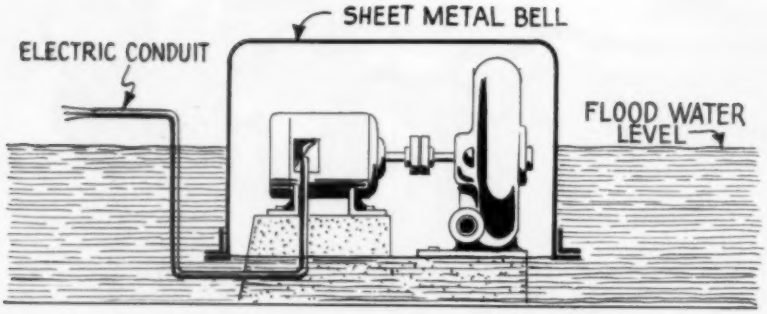
HINTS AND HELPS

Profit-making ideas developed by operating men



Steel covers provide motor protection

ROCK PRODUCTS PRODUCERS often have many of the same problems of protecting electrical equipment from flooding that riverside utilities or underground mines must contend with. One of these problems is how to keep water out of motors which operate emergency equipment—pumps, generators or water intake screens.

For a number of years the utilities have covered the motors of their water intake screens with "bells", airtight steel covers. These covers enclose the motor, which is near the top of the housing. When water rises into the bell it compresses the trapped air and never reaches the motor which continues to operate as usual. Of course, the skirts of the bell must be far enough below the motor to permit the water to rise a few inches inside the housing.

One warning—don't do as one mine operator did, who carefully constructed an airtight cover for a motor only to neglect to seal the opening through which the electrician put the conduit for the electric wires to the motor.

Crusher house safety effected by simple screen

A SAFETY-CONSCIOUS rock producer in the Southwest realized that when his "tough" rock was crushed it might send fragments flying upward. A few lengths of heavy pipe and angles made this simple screen which effectively confines any rock to the throat of the crusher. At the same time, it does not restrict the operator's view of the crushing; it is light enough to be quickly removed with the overhead hoist to gain access to the top of the crusher.

Conserve storage space

MOST AGGREGATES PRODUCERS do not have the storage space or conveyor equipment to segregate all the different specifications of materials they make.

One western aggregates producer had the problem of storing two products of the same size range, but of a different composition within the top and bottom sizes. One material was a crusher-run, the other an asphalt plant mix, and each was produced alternately in the same equipment. Top size was about 1 in., but the asphalt mix had a specified amount of fines to act as a mineral filler.

He realized that he could save space and conserve equipment by storing these two materials on the same pile. He fitted the stacker belt with a splitter plate to throw one material to one side, the other material to the other side. When either product is being shipped the front end loader loads out from the correct side of the pile. He has found that there is very little mixing of the two classes of material, even at the top of the pile.

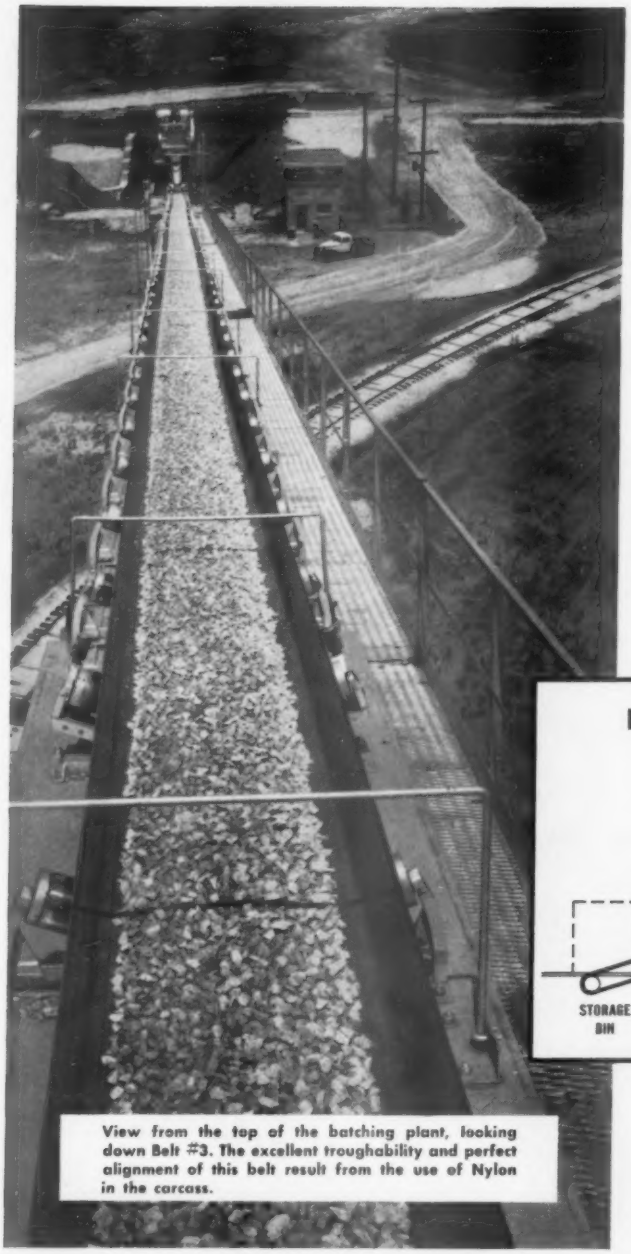
Ball on a rubber band

IT IS AN EASY MATTER for this shovel operator to break his own boulders when they're too large to load out into trucks. A drop ball is slung on an old truck tire carcass which has plenty of resilience left in it to protect the bucket teeth from shock. The tire makes it easy for the operator to pick it up or to put it down without getting out of the control cab every time.

Fan filters

ONE OF THE LATEST developments in filters is this "continuous" filter on the fan of a gypsum board machine. A visual inspection quickly determines if the filter needs changing, and this is done simply by stripping a length of glass wool from the roll beneath the fan.

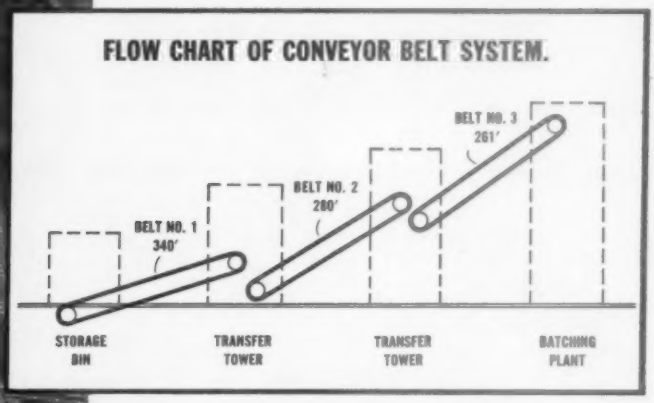
(Continued on page 91)



View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.

US RUBBER CONVEYOR BELTS

Push-Button Control and U. S. Conveyor Belts help turn out 120 cu. yds. of concrete per hour



"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

And that's what this plant has. Almost 2,000 feet of U. S. Rubber's 30" wide U. S. Matchless patented Style XN conveyor belting carries raw materials through the reclaiming tunnel, then up a steep grade to a turn head—electrically controlled—and finally discharges the cargo into the always-hungry jaws of the huge batching plant.

One man in a control tower oversees the entire operation, from storage pits to plant bins. The control board tells him when a bin is getting low. By pressing a button he can start one of the three U. S. Belts hauling sand, stone, or other aggregates to the proper bin. "We expect many years' service from these belts," adds the plant's president, J. Roy "Cap'n" Pennell.

This is another good example of U. S. Rubber's Three-Way Engineering, in which "U. S." engineers work as a team with the plant engineers and the conveyor system engineers . . . to obtain the *right* belt for the job. This type of assistance, plus a complete line of conveyor belting, can be obtained at any of our 28 District Sales Offices, or contact us at Rockefeller Center, New York 20, New York.

In Canada, Dominion Rubber Co., Ltd.

*Greenville Concrete Co., Greenville, S. C.

US RUBBER Mechanical Goods Division

United States Rubber

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CONSTANT QUALITY CONTROL

is the reason why MAGNECON* is acknowledged as the leading hot zone refractory for rotary kilns all over the world.

Magnecon*— a true product of scientific refractory research — is subject to 24-hour chemical and mechanical tests at the mine and plant of CRL. For instance:

*registered trademark

Engineers check the selection, mixture and density of the clinker. A similar close watch is maintained at every stage of the manufacturing process at CRL's Marelan plant.

Experts operate the brick presses. Samples of the brick are analyzed regularly to insure complete uniformity.

CANADIAN REFRACTORIES LIMITED
REFRACTORIES
MONTREAL

Optical pyrometer readings double-check the automatic temperature controls regulating the kiln operations at the CRL plant— the world's most modern refractory plant.

Scientific tests are conducted in the completely equipped CRL plant laboratories. Here, the unique properties of Magnecon* were first developed.

For a hot zone refractory that will build up and hold a sound coating—give you more production and greater economy—you can rely on MAGNECON*

CANADIAN REFRACTORIES LIMITED

CANADA CEMENT BUILDING, MONTREAL, CANADA

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HINTS AND HELPS

(Continued from page 88)

Splitter plate

PHOTOS LIKE THIS are hard to get, for the discharge end of most belt conveyors is usually enclosed or inaccessible. This rock products producer split the flow from the head of the conveyor under the crusher but found that it was almost impossible to divide it evenly without this movable splitter plate.

The vertical plate is mounted on a pipe which can be turned with a lever and adjusted to any angle. Now the flow can be exactly proportioned between the two screens, or the flow can be entirely diverted to one or the other. This arrangement gives him an unexpected flexibility in the operation of his crusher and screens.

Huge rotary kiln tire repaired by squirt welding

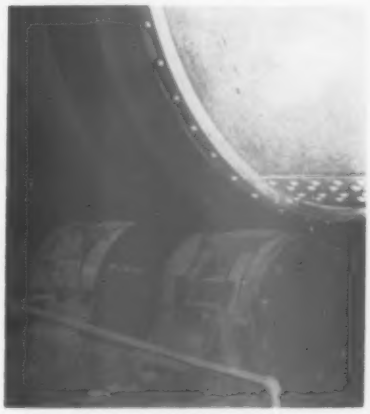
ONE OF THE CAST STEEL channel tires on a rotary kiln in a large eastern cement company recently cracked in service. It either had to be replaced, with a long delay and expensive dismantling of the kiln, or repaired without removing the 12 ft. diam. tire. This was done by welding steel plate segments to the side of the channel leg which was broken.

Arc-shaped sections were flame cut from 1 in. thick steel plate, and the outer edge chamfered. This bevel provided a V-groove in which weld beads could be laid down to secure the plates against the channel section. The tire was drilled for through bolts to hold the plates in place until the welding was done.

The kiln is driven by gearing at about 1 rpm. making a rim speed much too fast for welding. A gear reduction unit was installed to reduce the kiln speed temporarily to about 1 rev. every 31 min., making it necessary to deposit weld material at about 14½ in. per min.

Such a welding speed could be attained with a semi-automatic "squirt" welder used for other work in this plant. The welder was mounted on a scaffold above the kiln tire with the welding gun supported directly above the V-groove. Two rack bars permitted convenient sidewise and radial, up and down, movement.

The welder fed 5/64 in. electrode wire automatically, and flux was fed automatically from a hand-filled conical hopper—a part of the welding gun. Current of about 300 amp. was



supplied giving high current density and excellent penetration. Enough beads were laid down to completely fill the groove, and the finished weld provided ample strength to hold the reinforcing plates to the tire.

The whole job was performed, including plate penetration, in about one day without dismantling the kiln. Compared with replacement costs, this procedure resulted in large savings. The repaired tire is shown with the weldment along the near tire edge.

Fuels need care, too

ATTENTION TO SMALL DETAILS often makes the difference between costly operation and trouble-free performance of equipment. One crushed stone producer works right through zero degree weather and has discovered that machinery can keep operating better if it is serviced with warm fuel and lubricants.

Diesel fuel is stored in an electrically heated, fireproof and isolated building in 500-gal. tanks. Drums of oil and grease are stored on shelves in the same building which is kept between 60 and 70 deg. F. The building itself is enclosed, but oil can be delivered through pipes which extend outside of the building within easy reach of a service truck.

Ground electrical equipment

IS YOUR ELECTRICAL EQUIPMENT properly grounded? If not, it may cause serious burns, shock or even death. Slight shocks may cause fatal falls or other injury.

Even equipment which appears to be in safe operating condition may have shorted or exposed wires. When these wires touch metal framework of operating equipment it may become energized with a lethal current. To reduce this hazard it is important that electric tools and steel frames be grounded to a low-resistance ground connection. Any metal in contact with the earth is usually suitable.

The National Safety Council has the following suggestions to make about grounding portable electrical equipment: All armored cable and metal conduit should be checked to make sure that all couplings have metal-to-metal contacts to assure a continuous ground return of stray current. All grounding wires should be checked to make sure that their capacity is equal to, or exceeds the rating of the nearest fuse or circuit breaker. There must never be fuses, breakers, or switches in any "white" ground wire, and the use of three-prong plugs with a U-shaped ground blade is recommended for all electrical equipment.

END

Power shovel breaks down . . .

So quarry moves boulders with

All over the country, more and more dirtmovers are finding Michigan Tractor Shovels can effectively handle jobs once considered much too tough for rubber-tired equipment.

You've probably read about—or seen—Michigans digging pit-run gravel. Or breaking out reinforced concrete. Or clearing brush. Now here's another dramatic application.

Maintains pit production

The company involved, a large northeastern firm, had always had trouble maintaining pit production when any of their big power shovels broke down. One time this happened, they had a Michigan Tractor Shovel in the pit on demonstration. They decided to put it through the rugged test of rock loading.

Now own six Michigans

That was in 1954. Today, this company owns *six Michigan Tractor Shovels!* In emergencies these units effectively handle both rock loading and cleanup. They also handle *all* truck-loading of screened aggregates and other products of the multi-million-ton crushed stone plant. Management estimates their output "definitely greater" than output of loaders formerly used. Maintenance costs, over periods ranging up to three years, have been "satisfactorily low".

Boulders weigh up to 7 tons each

Note the photos. Above, one of the company's five 2¾ yard Michigan Model 175A's is moving huge boulders to stockpile for later sale as rip-rap. Each chunk weighs ½ to 7 tons . . . yet at no time has operator reported trouble handling them. Upper right, another Model 175A loads shot rock at the quarry face. Michigans' unobstructed dumping height, power shift, and power steer helps speed both emergency assignments.

Load 10 tons in 2 to 3 minutes

Stockpile loading (lower right) keeps the company's

This is the type of shot rock that must be loaded into trucks for transport to crushers. Michigan Tractor Shovels must be able to take a lot of punishment—and they do!

A full bucket every time saves trips, cuts handling costs of loading crushed stone or sand. This load weighed out at 7,000 lbs. This model Michigan can lift 15,000 lbs.

2¾ yard Michigan

2 yard Model 125A and most of the 2¾ yard Model 175A's busy most of the time. Good mobility and unexcelled breakout, *equally great* through the entire lifting arc, make quick work of this job. The Model 125A needs only 3 minutes to heap a typical 10 yard truck . . . the bigger Model 175A's require only 2 to 2½ minutes.

24 mph travel speeds odd jobs

Michigan speed pays off on odd jobs, too. Like cleanup of haul roads, stockpiles, and around crushers. Pushing loaded trucks up grade. Setting utility poles. Hoisting crusher screens and other heavy equipment. Switching railroad cars (up to 25 empties at once). Plowing and removing snow. Despite year-around work averaging 50 hours a week, company officials report "downtime negligible." And continuing, "The all-Clark-built, all-matched power train sure boosts efficiency. From power shift, power steer and 3-to-1 torque converter to planetary wheel drive axles . . . our '54 model has the same components as our newest rig . . . which certainly proves how good the Clark design is. We like the speed of loading . . . the speed between job sites . . . the excellent performance on emergency rock-handling . . . the lack of downtime . . . the ease of maintenance. That's why we've been repeat-buyers five times!"

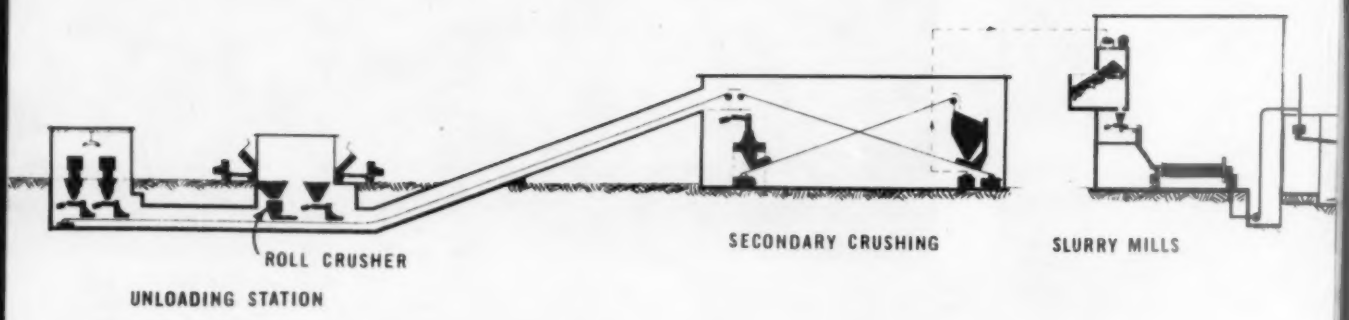
Make your own test

A demonstration, gladly arranged by your local Michigan Distributor, will show you why you too should be a Michigan Tractor Shovel buyer. Put the demonstrator on your toughest loading jobs . . . we'll bet *our cost* of the demonstration *against your time* you'll really be *enthusiastic* about the results!

Michigan is a registered trade-mark of

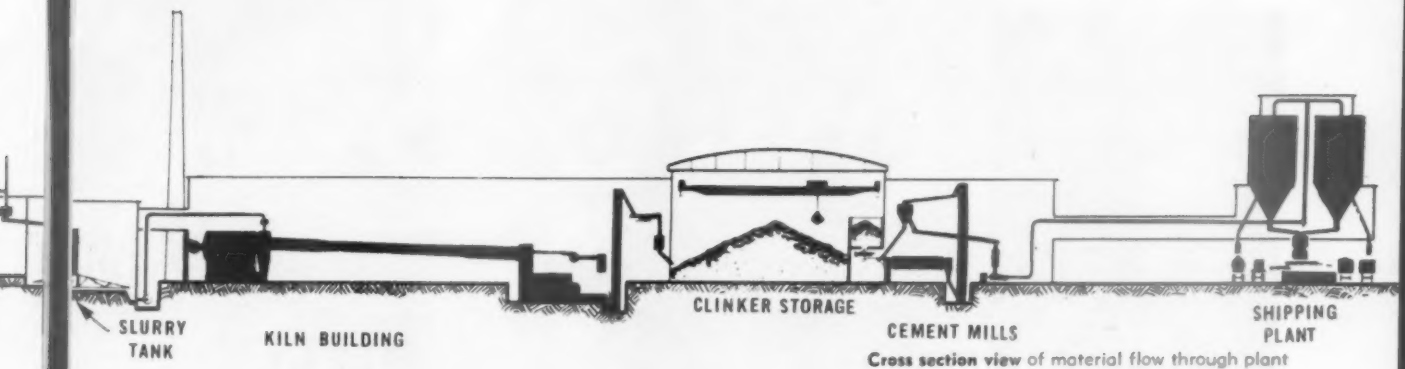
CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 42, Michigan
In Canada: Canadian Clark, Ltd., St. Thomas, Ontario



Cement company aids

The new plant is located on Lake Ontario and this aerial picture shows the first big dock built on the Great Lakes to handle deep sea ships. The plant is shipping cement to the St. Lawrence Seaway project and throughout Ontario



Cross section view of material flow through plant

Ontario's booming economy

St. Lawrence Cement Co. surveyed their market, came up with some surprising answers and went ahead to build Canada's most modern cement plant

By GEORGE C. LINDSAY

WHEN THE PROVINCE OF ONTARIO, Canada, found itself badly in need of cement to carry on its fast-growing construction program, St. Lawrence Cement Co. came to the rescue with a new plant that doubled Ontario's cement-producing capacity within a two year period. It added 15 percent to Canada's capacity.

The company put its $30 million plant in the Toronto area where the cement consumption is biggest—5 million bbl. annually. It built in enough capacity to serve the area for a good many years—an area in which economic growth parallels that of the U. S.

This contribution to Ontario's economy did not just happen; it was made to happen. The new plant is the result of extensive and thorough market research, plus the faith of the company's young, vigorous executives in the future growth possibilities in the Province of Ontario.

Here's what the cement company found in their surveys: Canada's population is growing—fast. It jumped from 11 million people in 1940 to 16 million in 1956—up 45 percent. Consumption of cement per capita is growing, too—from 0.6 bbl. per person in 1940 to 1.9 bbl. per person in 1956. Multiply the growth factors together and you learn—as St. Lawrence Cement Co. learned—that total cement consumption had jumped nearly fourfold in 15 years.

In Ontario alone, 1956 demand for cement was 10 million bbl., but one million was imported. By the beginning of 1958, Ontario's capacity to produce cement—including Clarkson's 3.5 million bbl. will have grown to 17 million bbl. annually. At the continued rate of increase in demand of seven percent per year the Province now will have enough capacity to last until 1964.

The big challenge. Knowing what the surveys projected as to capacity and markets in Ontario, St. Lawrence had a big problem. The new plant, if built, would provide a surplus of cement capacity for seven years. Capital investment needed to build a modern, efficient plant would be high. Consequently, ratio of the investment rate per annual bbl. of cement capacity to the projected sales price per bbl. would be very high. The element of risk was important.

St. Lawrence's answer to the problem was to accept the challenge. The company decided to build a plant to accent high quality of product and high efficiency in operation. This, they believed, was necessary to compete properly in a projected buyer's market in cement. The new Clarkson plant, then, is the result of business and technological

Complete list of major equipment is on page 164

From the mill station, a sample is conveyed to the laboratory by a pneumatic tube system

Ontario cement firm

continued . . .

acumen of company officials, coupled with a firm faith in the future of Ontario.

Quality and efficiency were "musts" for the Clarkson plant. But the young company executives (average age 40) met the challenge head on. They used the experience and knowledge of their parent Swiss company's technical and research staff, and operating experience of the company's Villeneuve, Quebec, plant to get the job underway.

Construction time for the plant set a near record. Clinker was produced only 11 months after construction began in September 1955. A second kiln went into production six months later. Current output rate of the two-kiln plant is now in excess of three million bbl. per year, but the company thinks it will go to four million with the same equipment. Each kiln is reported to have the highest capacity of any units on the continent.

Cement production facilities at Clarkson plant are most modern in process and appearance. Located in the middle of a high-class residential area—15 miles west of Toronto—the plant's manufacturing facilities are completely enclosed in buildings of well-planned architectural design. Much attention was given to dust collection throughout the entire plant.

Buildings and equipment foundations are built on hard rock; no piling was required. Structural steel and reinforced concrete were used in the buildings. Thirty precast and post-stressed roof beams, each 128 feet long and weighing 80 tons, were used for the main storage hall. Walls of the slurry basins are of prestressed concrete, and roofs of buildings are of precast Siporex slabs. The 20 concrete silos of the packing plant were built with the slip-form method.

Manufacturing processes at Clarkson are geared to automatic operation where possible, and they incorporate unusual features. The wet-process system is used. A single series of belt conveyors handles all raw materials between loading hoppers and the main raw-materials storage hall. Feed to all grinding mills is pre-determined as to proportions, and feed is at a constant rate to the mills by electronically controlled vibrating feeders. Each mill product is sampled every hour, and test results are available in 30 min.

The process requires no blending tanks since strict feed and laboratory control is maintained at the mills. Tests are underway to measure the exact flow of slurry to each kiln with the help of a gamma-ray counter.

Retention time of material in the kiln also has been measured. To do this, isotopes of lanthanum

Burner floor with kiln control panel

140 have been added to the feed and checked along the length of the kiln with a Geiger counter. Thermocouples on the kiln shells give continuous temperatures to indicate condition and effectiveness of kiln linings.

Another feature of the process is the reintroduction of dust through the burner pipe directly into the burning zone of the kiln. Kilns are fired by pulverized coal. Fuel consumption is below 900,000 Btu. per bbl. of clinker. A telescopic burner pipe is installed at each kiln.

Facilities for storage and packing of cement are designed to allow bag or bulk loading on trucks or railroad cars with a minimum of handling. The packing plant features gravity flow of material to each type of loading facility.

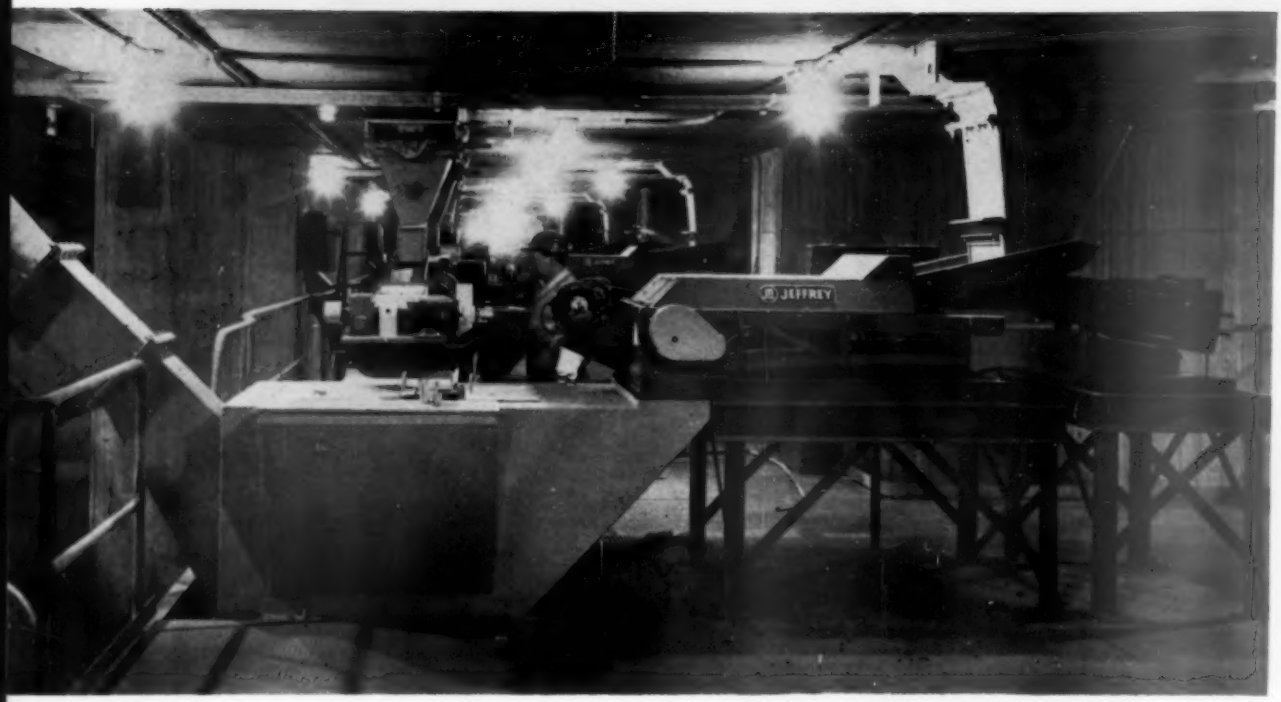
Maintenance and repair service is unusual. The cement company provides the workshop, which has a wide range of machinery. Maintenance work is contracted by the hour to Catalytic Construction Co., which supplies all the necessary labor required for any maintenance or repair project.

Materials for the raw mix at the plant consist of 75 percent limestone and 25 percent shale. Shale is mined on the plant site, but limestone is purchased from two sources. The shale quarry is operated under contract by Bliss Construction Co., and operation can be continued the year around. Present height of the quarry face is 15 feet, but plans are to go to a 60 ft. height. Material is loaded by shovel into trucks for delivery to the unloading station.

Limestone supply is brought in by rail from two suppliers, 80 to 100 rail miles from the plant. "Beachville" limestone (97-98 percent $CaCO_3$) is supplied by North American Cyanamid with ¾ in. top size and a maximum of 20 percent minus ⅛-in. size. "Uhthoff" limestone (93-95 percent $CaCO_3$) comes from United Limestone Products, with top size of 6 in. The company plans an emergency stockpile of 75,000 tons of minus 6-in. limestone. The company owns large limestone properties on Lake Ontario which will probably be opened in 1960.

Minus ½-in. gypsum rock is delivered to the plant by truck from Canadian Gypsum Co., a distance of 80 miles away. Coal comes by self-unloading lake vessels to the company wharf, on Lake Ontario adjacent to the plant, then is trucked to the main storage hall. A stock of 50,000 tons is accumulated during summer months for use during the winter. Noranda Mines supplies pyrite used for manufacturing Type II cement.

Flexibility is the keynote in handling raw ma-



Weight feeders for clinker and gypsum at the finish mill

Ontario cement firm

continued . . .

terials at the Clarkson plant. A single belt conveyor handles all materials, one at a time, delivered either by railroad cars or trucks. There are two unloading stations. The first handles limestone unloaded from railroad hopper cars. Material is fed to a 30-in. main belt conveyor by 48 x 60-in. vibrating feeders under two receiving hoppers.

The second station normally handles shale received by trucks. It also handles truck delivery of gypsum and pyrite. Material from one of the two receiving hoppers at this station goes to the main belt conveyor via a vibrating feeder. The other hopper is reserved for material, mainly shale, that is crushed to minus 5-in. size in a 30 x 50-in. single-roll crusher before going to the belt.

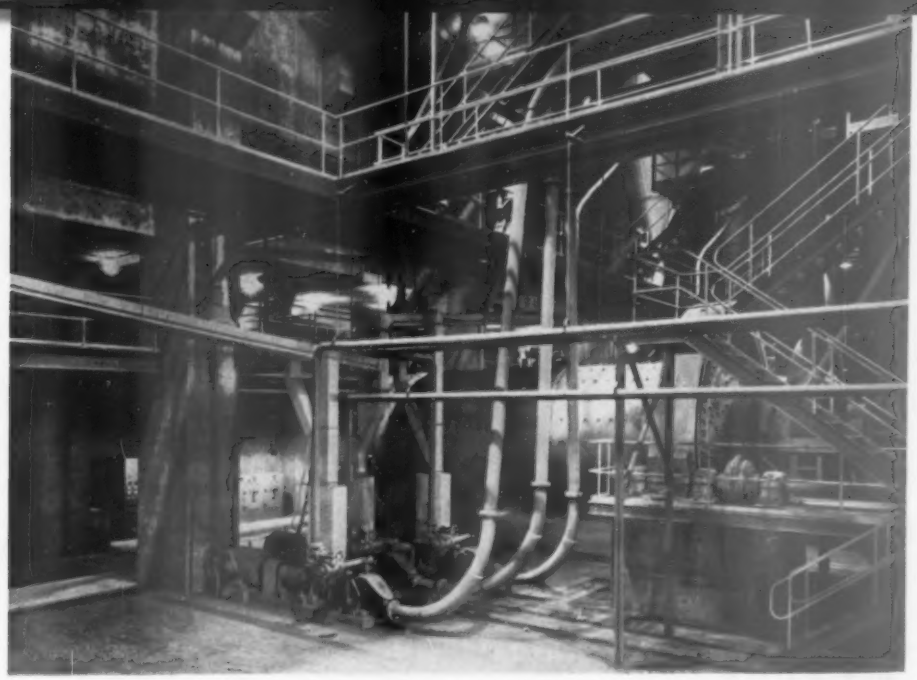
The main belt discharges at the secondary crushing building onto a 60 x 72-in. vibrating feeder that fans out material into a reversible impactor. That unit, with maximum capacity of 450 tph., produces a minus ⅝-in. product from a minus 6-in. feed in closed circuit. Crushed material is screened at ⅝ in. on a pair of 5 x 12-ft. single-deck vibrators, the through product going by belt conveyor to mill storage silos. Plus size from the screens is recirculated.

Facilities at the secondary crushing station also provide flexibility in handling raw materials. A 60 x 72-in. vibrating feeder is mounted on a swivel base so it can turn 90 deg. in either direction. Positioned in one direction, material bypasses the impactor and goes directly by belt to the mill silos. Turned in the other direction, material from the feeder goes to a 70-ton bumper silo outside the building. It is trucked from there to open storage to be used as emergency stock.

Two bag-type dust collectors serve the secondary crushing building. One vents the impactor and vibrating feeder. The other vents the pair of covered screens and the belt-conveyor hoppers. Also, a liquid dust-control system using Compound M has been installed at the unloading station recently to eliminate dust at that point.

Raw grinding is done in four identical 8 x 37-ft. three-compartment Compeb slurry mills that turn at a rate of 18.7 rpm. Specific control over the slurry mix is maintained at the feed end of the slurry grinding section with the use of electrically interlocked vibrating feeders. Samples of each mill product are taken at hourly intervals and sent to the laboratory via a pneumatic-tube system. Control is fast, since test results are available to the mill operator in 30 min.

Raw materials from the secondary crushing



Finish mills with pneumatic conveying system

Loading tank trucks through dust-tight spouts

plant are stored separately by a belt tripper in a row of mill feed bins that parallels the storage hall. Each limestone bin has a capacity of 800 tons. Each bin is L-shaped, the leg of which is a pocket in the main storage hall. This allows filling or emptying of the bins with one of two 20-ton overhead cranes in the storage hall.

Each mill is fed by three vibrating feeders, those for limestone and shale being rail mounted so they can withdraw material from two discharge openings in each bin bottom. Capacity of the movable limestone feeder is 60 tph.; that of the shale feeder is 0 to 15 tph. A small 0 to 3-tph. feeder is available for pyrite or other additions. Materials are mixed on a common 18-in. belt conveyor that discharges into the feed spout of the mill. Feed water, which also is added at that spout, is controlled by a manually operated valve.

Two of the four mills are used for each of the two kinds of limestone. Output is 40 to 50 tph. and 50 to 60 tph., respectively, with grinding to 80 percent passing 200-mesh sieve slurry, 33½ percent water, from a minus ¾-in. feed.

All mills have manganese wave-type liners in all compartments. The mills carry a total ball charge of 190,000 lb., sizes ranging from 1¼ to 4 in.

Slurry basins. Four 80 ft. diam. post-tensioned concrete slurry basins can hold enough slurry for six days of normal kiln operation—27,000 tons of slurry. No circulations of slurry for blending or correcting purposes is required, since accurate proportioning is done by the slurry-mill feeders.

Slurry from each mill goes by common canal into either one of two slurry pits. From there, it is pumped to the slurry basins through either one of two 8-in. pipe lines. Pumping is done by four 6-in. 400-gpm. (U.S.) slurry pumps. Slurry in each basin is kept in suspension by a motor-driven agitator. Air is supplied to the agitator arms at 35 psi. by two 760-cfm. rotary compressors.

Company practice is to use two basins for the slurry from the mills, then pump it to the other two that are called kiln basins. A pump house between the four basins has two 6-in. (one a standby) pumps to move slurry from the mill basins to

Please turn to page 162

Test your tax I.Q.

WITH APRIL 15TH lurking around the corner, now is a good time to test your knowledge of federal income tax law. This quiz, prepared by the American Institute of Certified Public Accountants in cooperation with the Internal Revenue Service, will give you a chance to check your understanding, and it may offer some valuable clues that will save you headaches and money when you prepare your returns.

During the past year you spent approximately $1,000 for built-in bookcases and wall-to-wall carpeting for your office. Since your lease has only four years to run, you may . . .

- **(a) Deduct the $1,000 on your 1957 return**
- **(b) Amortize the cost over the next four years**
- **(c) Depreciate it over the period of the life of the furnishings**

On leased property, you normally spread the cost of improvements over the shorter period—the life of the improvement or the term of the lease. Since your lease expires in four years and presumably the furnishings will have a longer life than that, you should be able to claim a $250 deduction on your federal tax return for this year and the next three years. The answer is (b).

When you were transferred to another city, your company gave you a sum of money toward the cost of moving you and your family. For tax purposes you should consider this money as . . .

- **(a) A gift that is not taxable**
- **(b) Income that is subject to tax with a deduction for only your moving expenses**
- **(c) Income that is subject to tax with a deduction for the cost of moving your entire family**

The money you received from the company must be reported as income, but you may deduct the cost of moving your entire family. If the amount the company gives you exceeds your expenses, the excess is taxable. Conversely, however, if your expenses were more than the amount received, the difference is not deductible. The answer is (c).

Here are the answers to questions like these:

"What about my stocks? Do I have to declare all my dividends as income?"

"My company paid my moving expenses when I was transferred. Does this count as income?"

"Can we deduct the cost of replacing the roof of our office as a business expense?"

You have invested in several blue-chip stocks. The dividends received from this investment are exempt up to . . .

- **(a) $50 whether you or your wife owns the stock**
- **(b) $100 if the stock is held jointly by you and your wife**
- **(c) $100 regardless of who owns the stock, providing you file a joint return with your wife**

All taxpayers are entitled to a $50 dividend exemption. A husband and wife can combine their exemptions and receive $100 in dividends tax free, providing the stock is jointly owned. The filing of a joint return will not qualify them for this double exemption if the stock is held in only one of their names. Therefore, answers (a) and (b) are both correct.

You are NOT permitted to deduct as contribution your donations to which of the following organizations . . .

- **(a) Charitable societies**
- **(b) Educational institutions**
- **(c) Political parties**

You cannot deduct contributions to an organization which spends a substantial part of its time lobbying or distributing political propaganda. The answer is (c).

Your daughter, who was hospitalized for several weeks in the earlier part of 1957, was married in November. If she files a joint return with her husband, you may . . .

- **(a) Not claim her as a dependent but you may deduct her medical expenses**
- **(b) Claim her as a dependent and deduct her medical expenses**
- **(a) Not claim her as a dependent and you may not deduct her medical expenses**

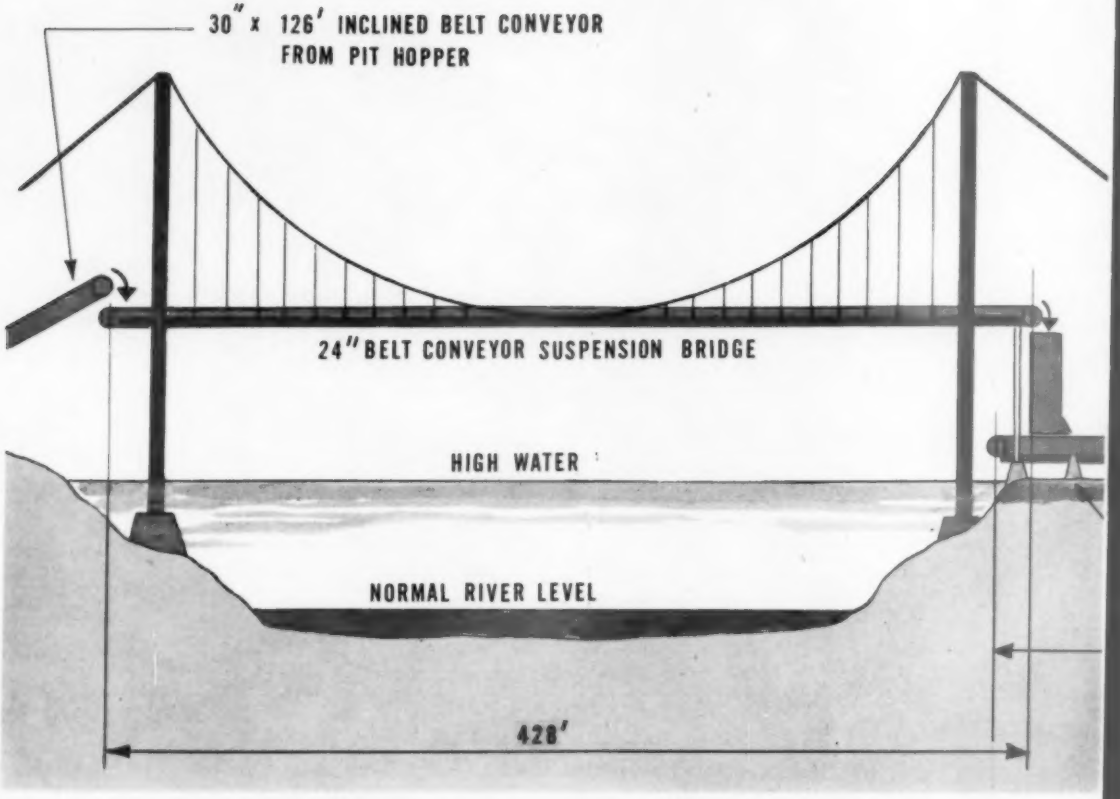
You gained a son-in-law but lost a $600 dependency exemption for 1957 when your daughter married in November. All is not lost, however. If you provided more than one-half of your daughter's support during the year, you may claim her medical expenses as a deduction on your return. The answer is (a).

You filled very few inside straights during the past few months and lost $300 to members of your Thursday night poker club. You should . . .

- **(a) Deduct the loss in computing adjusted gross income**
- **(b) Subtract the loss from adjusted gross income**
- **(c) Give up poker and start watching television on Thursday nights**

Watching television can be most relaxing and

Please turn to page 166



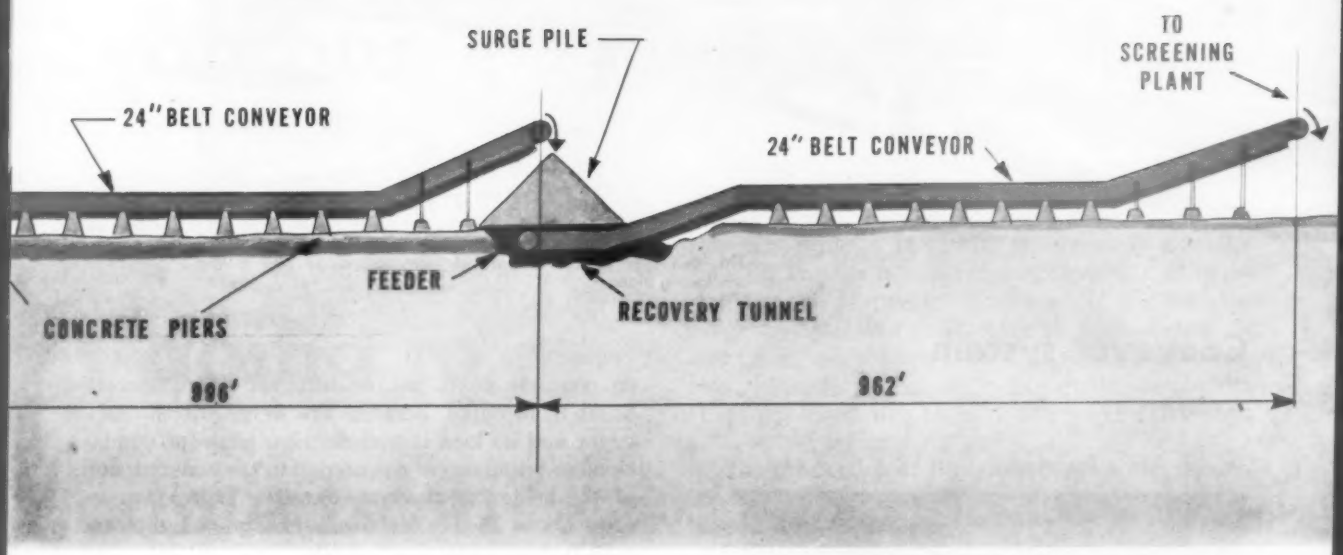
Bridge carrying the conveyor from the pit to the surge pile

Conveyor system

A BELT CONVEYOR SYSTEM now crosses a river to bring gravel from a deposit considered virtually inaccessible to the existing plant of Basic Construction Materials Co. near Chillicothe, Ohio.

The newly discovered and proven gravel is among the best in Ohio, but it is on the other side of the shallow, capricious Scioto River from the firm's existing screening and washing plant. Even though the 100-acre tract was within sight of their plant, company trucks would have to travel more than four miles through residential areas to bring the gravel less than half a mile from the pit to the plant. It would have been a major construction project to build a truck bridge and a heavy-duty levee across the flood plain of the river to support a haulage road above high water.

Basic engineers solved the problem with a "rubber highway"—a belt conveyor haulage system which bridges the river and crosses the river flats on a man-made embankment. Now nearly 2,500 ft. of conveyor system brings 200 tph. of raw gravel to processing plant by spanning the river.



Diagrammatic sketch of Basic's conveyor system

spans river to connect pit, plant

Cost of the entire system was a little more than $100,000, a fraction of the estimate for a heavy-duty haulage road across the river flats and for a truck bridge across the river. The layout and design of the system was done by Basic's own engineering staff while earthmoving and construction was done by operating people from their gravel processing plant during the winter and spring months of 1957.

The system was completed in July, 1957 when the 428 ft. long bridge was dedicated to Edwin H. Davis, chairman of the board of Davon, Inc., parent company of Basic Construction Materials Co.

Most of the preliminary work of preparing the new deposit for operation has been completed. The overburden has been removed from the working area, and the 2-cu. yd. clamshell will dig the gravel below the water table and load it out into a 26-ton truck to be taken to the truck dump hopper. This hopper is located in the corner of the property closest to the processing plant and is near the high north bank of the river.

Gravel is fed from the hopper to a 30 in. wide, 126 ft. long inclined belt conveyor with a vibrating feeder. The inclined belt is the first of four belt conveyors in the system to take the gravel to the washing and screening plant: It takes the gravel from the truck dump hopper to the bridge belt.

The 428-ft. long bridge is unusual in the sense that the cross-braced channel frame of the conveyor itself is the deck of the bridge. This frame is suspended from the catenary of a pair of 1½ in. diam. wire ropes with wire rope cables spaced about every 15 ft. along the conveyor. Two suspension towers rise about 40 ft. above their concrete piers to support the two suspension ropes, which are firmly embedded in concrete blocks on each bank of the river. The deck of the conveyor holds the 24 in. wide troughing idlers and carrying belt as well as the belt and idlers on the return section. There is no walkway along the belt crossing the river.

Raw gravel is discharged from the bridge con-

This conveyor carries the gravel from the surge pile to the processing plant

Conveyor system

continued . . .

Gravel is discharged from the bridge conveyor to storage conveyor at this point

veyor at the end of the bridge to a 24 in. wide, 996 ft. long belt conveyor. This conveyor crosses the flood plain of the river on a high, narrow embankment above flood stage. The conveyor frame duplicates the design of the bridge conveyor with braced channel sections. The framework is mounted on concrete posts poured integral with concrete bases in the dike. Because the weight of the conveyor and its load is well distributed deep foundations or pilings were not needed in the construction of the bridge or the embankment. This conveyor rises about 11 deg. at the discharge end to form a 40 ft. high conical surge pile.

The surge pile enables the screening and washing plant to operate almost completely independently of the raw gravel operation. The conveyor can store several thousand tons of gravel in the stockpile while the processing plant is not operating. Then the screening plant can draw on this storage pile for a number of days if the gravel pit is shut down for any reason. This gives the whole system a large measure of flexibility.

Reclaim from the surge pile is through a vibrating feeder in the concrete tunnel below the stockpile which loads the final belt conveyor in the system. This conveyor is 24 in. wide and about 962 ft. long and is also steeply inclined at the discharge to load the 4 x 12-ft. primary washing screen in the processing plant.

The long distance belt conveyor haulage system has given Basic the advantages of high capacity at low cost with low operating expense. In addition, the capacity of the system can readily be increased by increasing the present 350 fpm. of the belts by small changes to the sprockets of the final chain drive. The additional production will not require additional labor or maintenance expense.

MAJOR EQUIPMENT USED AT BASIC CONSTRUCTION MATERIALS

Clamshell shovel, 2 cu. yd.	Northwest Engineering Co.
Truck, 26 ton	Euclid Div. General Motors Corp.
Vibrating feeders (2)	Jeffrey Mfg. Co.
Belt conveyor assemblies	Barber-Greene Co.
Belts	U. S. Rubber Co.
Vibrating screen, 4 x 12-ft.	Iowa Manufacturing Co.

END

Where's all our raw material going to come from?

"We just cannot plan our expansion fast enough. Instead of worrying about excess production and excess capacity in a few lines, we should ask ourselves, where is all of this raw material coming from?"

By JOSEPH L. GILLSON
Chief Geologist, E. I. du Pont de Nemours & Co.

WHILE WE'RE DOING ALL this talking about expansion and increases in production, let's sit down for a minute and ask ourselves, "Where's all this raw material going to come from?"

The production of nonmetallic materials has long been a very large industry, and one connected initially with the basic economy of the country. A study and evaluation of the production statistics of these materials is an accurate measure of the greatness of the economy of the United States.

A glance back over the past 50 years of the life of this country shows the breath-taking growth of our economy. The day that the First World War broke out in Europe marked the end of an era. From that day our economy has practically exploded.

The development of the automobile and of the airplane affected the metal producers in a fundamental way, as to volume, and especially as to diversity and in quality of product. It fostered the very birth of the production of such metals as tungsten, molybdenum, vanadium and chromium, and although aluminum was in production before the airplane it was then an expensive curiosity.

The production of these new metals and the expansion in production of the old ones also caused a dynamic growth in the production of the nonmetals. More limestone was needed for the steel furnaces; soda ash and fluorspar for aluminum metallurgy, better and more refractories for the furnaces of all types, more sand for the foundries, and more and better abrasives for metal finishing—the very like of which was never dreamed of in 1914.

With the automobile came the roads, the bridges, the tremendous housing developments and the supermarkets, all demanding sand and gravel, crushed stone, tile and sewer pipe, cement, gypsum, glass by the thousands of acres and paint by the millions of gallons. The building industry has been and will continue to be the largest volume user of industrial minerals. The huge road building program resulting from the Highway Act of 1956 is expected to be one of the biggest stimulants to the production of the basic product, crushed stone, sand and gravel and cement.

The building industry has also been a great stimulant to many new products. Gypsum wallboard has replaced the old lath and plaster with which we used to finish the interiors of our houses. Spectacular new decorative and functional glasses have come, and more are coming. There has been a tremendous growth in white ware, tile and even in brick. Perhaps the most spectacular growth has come in lightweight aggregates, for which we use perlite on the West Coast, and two types of expanded shale all over the country.

The original of this excerpt was presented at the 1957 Metal, Mining and Industrial Minerals Convention, Salt Lake City, Utah, Sept. 9-11, 1957

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Shovel scoops up the dense, blue limestone and gets it ready for the primary crusher

By ELWOOD MESCHTER

Stone plant sets

WHEN GIANT, AGGRESSIVE General Crushed Stone Company of Easton, Pa., decided to expand its service to the rich markets for rock products in central New York state, it chose to build its 24th plant by developing a hilltop quarry at Rock Cut, N.Y. Here at the southern city limits of Syracuse, the company built a 250-tph. washing and screening plant to process the material from a 35-ft. ledge of hard, blue limestone into clean, accurately sized aggregates.

The new plant was completed in July, 1957, and has been working almost continuously since then at full capacity. This has been necessary not just to meet everyday demand, but to build stockpiles for the spring and summer business in 1958. The quarry, hauling, screening, washing and shipping sections are operated by 28 men on one shift. The second shift of six men performs the screening, washing and storage operations.

From quarry to shipping, great care is taken at every step in the process to control the cleanliness of the stone. All roads in the plant are treated with calcium chloride to control dusting. Stockpiles are carefully segregated to prevent mixing of sizes, and are laid out to assure adequate drainage. The thin layer of topsoil and overburden in the quarry is carefully stripped off to expose the top of the rock.

The drill puts down a 4¾-in. hole about every hour. Each hole is about 12 ft. apart and 30 ft. deep. Blasting is done once a week, bringing down 400 to 500 ft. along the face of the 150-acre quarry. Blasting operations are carefully supervised to avoid disturbing the nearby residential areas. Seismograph readings are taken during each blast; dust readings are taken to evaluate any dusting which might originate in the quarry.

Heavy trucks haul the broken rock from the shovels, working both ends of the face to the centrally located primary crusher. The shovels are kept working at top capacity with the help of a bulldozer which keeps rock close to the face and within reach of the shovel. A crane with a T-ball breaks up the slabs and cubes of hard rock which might be too large for the shovel or for the primary crusher.

This crusher is a 42 x 48-in. jaw crusher, fed with a heavy-duty inclined apron feeder. A short, 36 in. wide inclined belt conveyor takes the crushed material to a 4 x 10 vibrating screen which re-

Overall view of the plant from the surge pile to where it dips down to the washing plant

new standards for sizing

moves all minus ⅜-in. material. A chute at the feed end of the screen permits the raw stone to be sent directly to the surge pile without screening.

The screen has proved invaluable in keeping clay, topsoil and other contaminants out of the feed to the washing plant, since practically all of this deleterious material is contained in the minus ⅜-in. fraction. But since more than half of this discard is hard, blue rock it represents a potential reserve for small sizes whenever they are needed. For the moment these fines are conveyed to a truck loading bin and stockpiled out of the way in the quarry.

A 36 in. wide inclined belt conveyor takes the plus ⅜-in. crushed stone from the screen to the top of a 30,000-ton surge pile—storage which can keep the washing and screening plant operating independently of the quarry loading and primary crushing operation.

The production plant beyond the surge pile has two major parts. One is a conventional screening, crushing and rescreening system which delivers stone to a scrubbing, washing and screening plant. This plant yields thoroughly washed products, accurately sized into No. 4, 3, 2, 1, 1A and screenings (⅛ x 0), all of which meet the State of New York, Department of Public Works, Division of Construction specifications.

Raw stone is drawn from the surge pile with a vibrating feeder and taken to a three-deck vibrating screen above two secondary crushers on a 36 in. wide inclined belt conveyor. The top deck of the screen scalps off the plus 3½-in.—the top size of No. 4 stone, and drops this oversize to a 5½-ft. standard cone crusher set for 2½ in.

The second deck has 2½-in. square openings, the top size for No. 3 stone. The 2½ x 1¼-in. fraction is split between the washing plant belt and the cone crusher, with an adjustable gate permitting a change in the volume of either size to suit the requirements of the shipping bins.

The third deck screens the 1¼-in. stone, the top size for No. 2. All of this size is sent to the washing plant on the 36 in. wide belt conveyor running downhill to the top of the washing, screening and storage tower.

Material which goes through the screen is conveyed to the top of a second screening tower and discharged onto a double deck screen mounted

Primary crusher and primary screening operation

Stone plant

continued . . .

over a three-compartment steel storage bin. This screen has 1¼-in. openings on the top deck and ⅝-in. openings on the bottom deck. The carryover on the 1¼-in. screen is discharged into one bin, the 1¼ x ⅝-in. stone is discharged into a second bin and the minus ⅝-in. material is discharged into the third compartment.

The large materials in the first two bins can be discharged into 22 x 40-in. rolls in a portable crushing and screening plant, into a 4-ft. shorthead cone crusher to be recycled to the screening plant, or directly to the main conveyor leading to the washing plant.

The roll crusher produces only minus ⅝-in. dry fines which are screened to take out plus ⅛-in. stone. This size is sent to the washing plant, while the through-screen dry fines are trucked to the asphalt plant in the valley below.

The company took advantage of the fact that the quarry is on the top of the hill to put the dry screening plant in the quarry to keep any dust in the quarry area. The washing and shipping plant, located in the valley below is almost as high as the rim of the quarry. Crushed stone then flows by gravity through the washing plant into the ⅛-in. screen to remove sand or screenings. High-shipping bins; and by gravity into trucks. Trucks then roll downhill to the piles of stored stone in the very bottom of the valley.

The flow of stone into the washing plant is split between two 84-in. diam. scrubbers. Water is added to the dry stone as it comes over the head of the belt conveyor. This water is pumped from the sump under the scrubbers and contains a lot of fines, which are stripped out of the wash water just ahead of the belt conveyor by a 36 in. x 12 ft. long fixed screen. This screen removes plus 16-mesh material which is sent to the launder.

The rock is thoroughly scrubbed in the drums, and the last 4 ft. of each washer is made up of pressure sprays in this section aid in removing the fines and other materials which might adhere to the larger sizes.

Wash water from the scrubber and oversize from the fixed screen goes to a six spigot launder which drops the sand to a spiral classifier. Finished sand from this spiral goes to an outside storage pile where these "screenings" are stored for pile draining before shipment. Overflow water is piped to a settling pond in the valley below the plant which provides the 1,700 gpm. of clear water needed in the washing plant.

High-pressure sprays strip the clay and fines from the limestone

Main conveyor from screening to washing plant

All plus ⅛-in. material is taken to vibrating screens on a series of short belt conveyors for final separation before storage. An inclined double-deck vibrating screen makes a separation of the No. 3 and 2 sizes, while water sprays strip off any undersize which might adhere to the large stone before it drops into the 100-ton concrete storage bins below.

The flow of through ⅝-in. material is split between two double-deck vibrating screens which make the separation between the No. 1 and 1A sizes. High-pressure spray nozzles cover the entire surface of the top deck to flush through the small sizes of stone and to remove any trace of fines in the finished products.

The storage bins are fitted with high-level controls which signal the operator when the bins are

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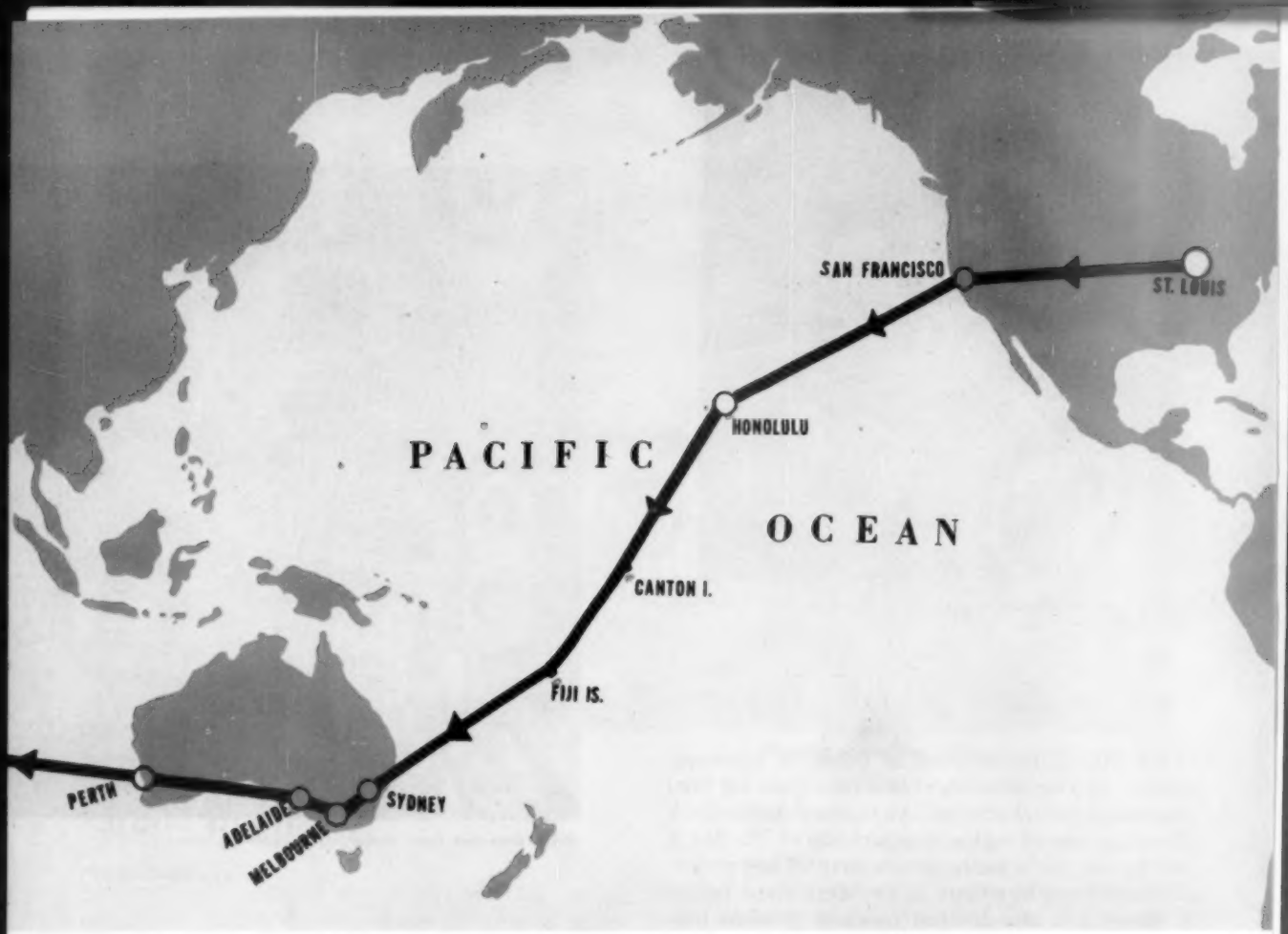
Set on another level are the concrete storage bins and the shipping plant

MAJOR EQUIPMENT USED BY GENERAL CRUSHED STONE CO.

Shovels (2) 280D, 2½ cu. yd.	Northwest Engineering Co.
Crane, No. 6 with dropball	
Drill, "down the hole rotary"	Ingersoll-Rand Co.
Bulldozer	Caterpillar Tractor Co.
Trucks (4)	Euclid Div., GMC
Crusher, jaw 42 x 48 in.	Pioneer Engineering Works, Inc.
Vibrating screen, 4 x 10 scalping	
Vibrating screen, 5 x 12, 2 deck	
Portable crushing plant	
Vibrating screens (2) 5 x 14, 2 deck	
Vibrating screen, 5 x 14, 3 deck	W. S. Tyler Co.
Vibrating screens (2) 5 x 12	
Crushers (2), 5-ft. std., 4-ft. shorthead	Nordberg Mfg. Co.
Idlers	Pioneer Engineering Works, Inc. to scalpscreen
	Stephens-Adamson Mfg. Co. to surge pile
	Link-Belt Co. under surge pile
	Link-Belt Co. to washing plant
	Pioneer Engineering Works, Inc. in portable plant
Scrubbers (2), 84 in.	Smith Engineering Works
Shipping scale	Howe Scale Co.
Asphalt concrete plant	Hetherington & Berner, Inc.



Lime consultant

Lime—around the world

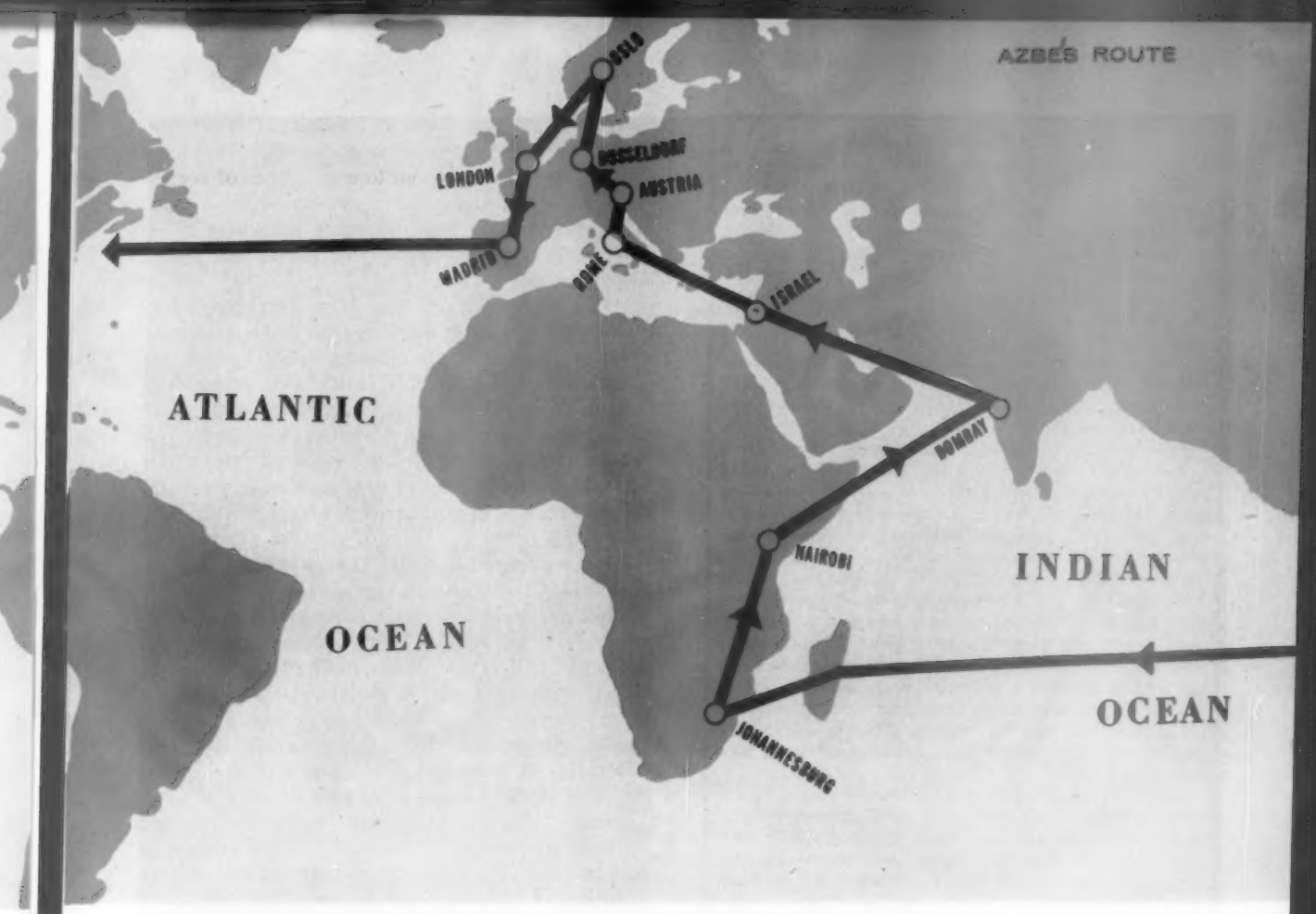
By VICTOR J. AZBE

INDUSTRY HAS as its basis certain fundamental essentials, without which there would be no industry. These founding substances, in volume, may not dominate but in influence are irreplaceably essential. There are only a few of these primary substances such as carbon, iron, sodium chloride, sulphur, lime and possibly a few others. Lime outranks even gold, since the latter is dispensable.

This statement may be disputed, but, what is a cement kiln if it is not primarily a lime kiln; and does not the blast furnace use lime as well as the open hearth charge, the glass tank and the pulp vat? What would the alkali industry do with its salt, if it were not for the lime and its CO_2 gas? Or what would the industries do, whose processes are based on carbide which is a product of carbon and lime?

Lime may, in seeming importance and volume but not in intrinsic importance, be out-classed by portland cement. Cement is for structures that could be built otherwise. But lime is important as the all pervading chemical agent.

Mr. Patel of India told me long ago, "We wanted to build a chemical industry in India, then we found we had no limestone suitable for lime." The Chilean Minister of Agriculture once told me, that



reports on first phase of his world-wide trip

in their rain drenched southern regions their leached soil is so depleted of lime, that the cattle are hardly able to stand on their feet. The remoteness of connections of these remarks is revealing in itself.

Lime, however important it may be, has never been given the commensurate degree of scientific, technical or proper practical attention, possibly because it has seemed that of all chemical processes, that of lime burning was the simplest, that one merely needed to heat stone well to have lime. In consequence, the development which followed, and still tends to, employed crude empirical lines rather than a path of thorough understanding and scientific exactness.

To just make lime was simple indeed, but to make good chemical lime cheaply and in the tremendous quantities demanded is not so simple. The man aspiring to true mastery of the lime making process must be in command of certain phases of the many branches of engineering. There are few such men. The making of lime did not seem to be important enough, schools ignored it, publications seldom featured the deeper meanings, and there were practically no books on lime. In the meantime, the world was awakening, populations were expanding and concentrating, industries were evolving, all demanding lime. The old types of kilns such as the intermittent field kilns, the natural draft hand-fired kilns, and such other relics could not satisfy the demand any more. A tight squeeze for lime developed all over the world.

Lime has been made for hundreds of years, but in the modern world ancient manufacturing practices would no longer suffice. To pay a man a living wage, labor required per ton had to be reduced by 10 and more, kiln production had to be increased by five and more, fuel had to be reduced by half and more. An Industrial Revolution, whose end is no more in sight than the Social Revolution, is now taking place.

ITINERARY

On September 24, Mr. Azbe left St. Louis after giving most of you a quick personal visit or contact. He departed under the staggering load of 93 lb. of technical data, two dacron shirts, a toothbrush and a bottle of tranquilizers. After his shake-down first hop to Honolulu, he wrote this quick article for ROCK PRODUCTS, discarded and revalued his paraphernalia, and on September 28, left Honolulu for Sydney, Australia.

The first refueling stop was Canton Island, "which is merely a coral rim with a lagoon, but we were served canned, cold Budweiser." Fiji Island was next, then 22 hours from Hawaii, he landed at Sydney, South Australia, on September 30.

Hydrated Lime Limited of Adelaide sent their Executive Director, Gordon Evans, to meet Mr. Azbe, along with the representative of the local press. The following day a broadcast recording was made and several interviews with radio personnel have been made since then in Adelaide and Melbourne.

After a brief rest in Sydney, he reported for work in Adelaide, having two masters to serve: Hydrated Lime Ltd., and the South Australian Geological Survey Bureau. There are very few, even poor, lime plants in Australia, and little or nothing is known about lime burning and manufacture. Distances are too immense and they are so isolated which limits information. There are no salesmen or company representative to call in, one cannot visit another lime plant—or even attend a lime convention!

For days they traveled the Continent trying to find a suitable lime deposit. After one month of searching, a room full of samples had been accumulated, a new laboratory has been set up, and now the testing will begin. A new oil-fired lime plant will soon be built, when findings are completed.

Mr. Azbe then flew from Perth to Johannesburg, the longest over-water air hop traveled by a commercial plane. In two days he arrived in South Africa to assist a new client with their lime problems.

He left Australia feeling well but quite tired, glad to have met the friendly and dynamic men of this country, and particularly happy to have been the honored guest of the Premier at a formal dinner party including the leading industrialists, and at another informal get-together with him and the new clients.

Azbe's world trip

continued . . .

I have been close to this for many years, having followed it for nearly forty and have been active in changing obsolete practices of many lands such as Argentina, Brazil, Guatemala, Mexico, Sweden, Israel and many others. The first induced draft kiln in any Latin American country was of my design, installed in Argentina 20 years ago. Visits to Europe and South America have been frequent and increasing. In recent years almost every year one or two long voyages have had to be made. They were not easy trips, some were quite difficult. Discomfort, sickness and even a heart attack was suffered with a long sojourn in a Brazilian hospital. But regardless of all that, it was very interesting and instructive—giving me great satisfaction to be able to be of service and to be useful to the development of humanity of the world. It was not a matter of monetary gain, but to be useful and helpful in my chosen profession that I love so much.

I had made many trips (the first for ROCK PRODUCTS), some 30 years ago, to Europe, during which I covered the continent from London to Constantinople in Turkey, and from Athens to Oslo in Norway. It was a lime plant study tour and a remarkable undertaking for those days.

Now I am starting on the trip of my life which will take me on a series of lime plant engagements, around the length and breadth of the world.

I am writing this under the swaying palms in Honolulu. This afternoon (October 4, 1957) I fly off to Sydney, Melbourne and Adelaide in Australia where they have many fuel, stone and production problems. I am traveling well prepared and heavily loaded with all sorts of materials to portray to them the modern practices and trends of the United States, also, drawings, papers, charts and 300 slides of technical data from which a whole series of lectures could be compounded.

From Australia I will fly the southern-most route by way of the Cocos and Mauritius Islands to Johannesburg, Union of South Africa. What sort of problems I will encounter there I do not know, since it seems that no two lime plants have the same problems. The kind of fuel, stone, labor and local conditions, in varied combinations can create a cycle of unforeseen situations.

Then I fly the length of Africa to Nairobi for a short tour to the veldt to hear the lion's roar—no desire to shoot any more, just to hear him roar will satisfy me. Of course, I could hear him better in the Saint Louis zoo, but it would not be quite the same, particularly because of my hearing impairment I will have to get quite close to him.

From Nairobi the flight takes me across the Arabian Sea to Bombay, India, where Tata is developing a steel industry which is hampered by lime production and stone quality problems. There is much else to do in lime in India and for that matter in almost any country, but my available time is limited and therefore, I will need to do the most within the least time period. This will not be an easy trip.

From Bombay I am to fly to Israel where Azbe oil-fired kilns have been in operation for a fair number of years. I have previously been in Israel.

From Israel, by way of Rome to Austria. This gives me a particular pleasure for a very special reason. The plant is near Salzburg and not far from the region of Austria where I was born. I

Please turn to page 172

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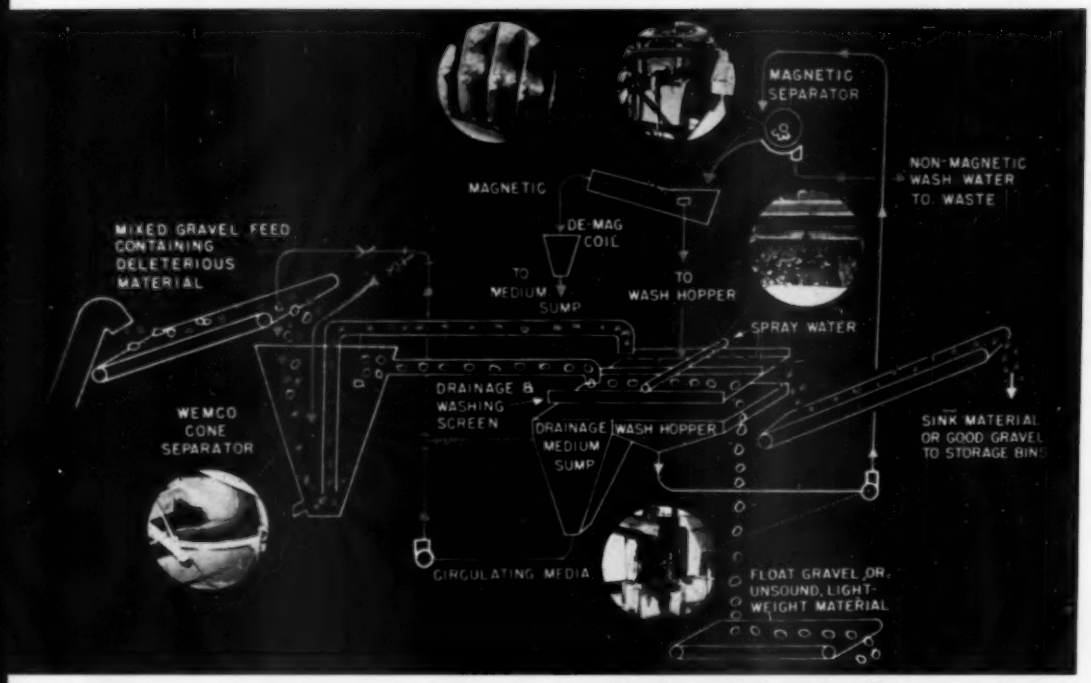


Flow diagram of Saticoy Rock Co.'s heavy media setup

Heavy media turns "waste" to profit

THE TWELFTH HEAVY-MEDIA separation plant for the sand and gravel industry in North America, and the first for Southern California, began operation last October for the Saticoy Rock Co. The neat, compact sand and gravel plant, a short distance south of Ventura, takes its material from the Santa Clara river. The deposit has given trouble over the years because of unsound gravel, high absorption, high sodium-sulphate losses and even progressive disintegration of materials, in the 1¾ x ½-in. sizes.

In essence, heavy-media separation is a cure-all for the type of gravel in this deposit. Its successful application to this particular aggregate settles a hotly debated argument as to the nature of the material that was started by the late Tom Stanton's controversial "reactive aggregate" theory.

Mr. Stanton, then head of the materials division of the California Highway Department, stated in a 1947 paper presented to the NSGA convention that certain silica rocks reacted to form a silica gel with the alkali in portland cement. Because the gel occupied more volume than its components, he said, it caused concrete failures. He based his theory on studies of aggregate from the Piru river, which drains into the Santa Clara about 20 miles upstream from the Saticoy operation.

Now it is known that the offending part of the aggregate is plain, unsound, soft, unstable particles. The Saticoy heavy-media separation plant is a good example of what can be accomplished with this type of material. The heavier gravel, or "sink" portion, marketed under the name of Sata-media Rock, has been upgraded to the extent that it compares favorably with the best aggregates in the West.

In the past, trouble with the aggregate was overcome, in a measure, by soft stone disintegrators, and by storage of certain sizes of gravel for considerable periods of time, before the material was re-run through the washing plant. Now with the heavy-media separator, sedimentation has been reduced to less than one percent. Sodium sulphate losses which were formerly in the 13 percent range are now reduced to .8 of 1 percent and so-called shale content reduced from 12 to 15 percent in the feed to 3 percent and less. The heavy media plant is a packaged, prefabricated unit and can be set up in three weeks, at a cost of about $90,000.

Please turn to page 116

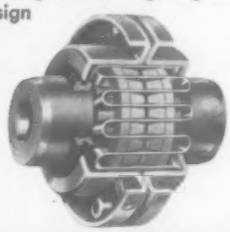
How one FALK coupling saved more than $1,000 per month

Pictured below is a Falk Steelflex Coupling assembly which connects a 2500 hp motor to a reduction unit driving an 18" bar mill in a Midwestern steel plant. This coupling replaced another type which broke repeatedly, causing maintenance expense averaging $1,000 a month—plus costly production losses. Since installation of the Falk Coupling, with its controlled torque mechanism that disengages when a predetermined overload occurs, there has been no interruption of production. Savings in maintenance and in lost production time are well in excess of $1,000 per month...dramatic proof of the importance of coupling design!

Long coupling life is not the sole criterion of coupling performance. Inadequate shaft couplings may be the cause of bearing damage or shaft breakage on your machines. If so, a change to Falk Steelflex will give two-fold protection to your connected machines: (1) compensation for reasonable degrees of shaft misalignment, and (2) torsional resiliency to reduce peak loads as much as 30%. These advantages are as important to you as the long service life of the Falk Steelflex Coupling itself.

Falk Steelflex Couplings, in types and sizes to meet virtually all industrial applications, are promptly available from distributor, warehouse and factory stocks. Consult your Falk Representative or Authorized Falk Distributor.

Basic **Type F**—cutaway view showing exclusive grid-groove design



THE FALK STEELFLEX ...a truly flexible coupling

Here is the coupling that has all the strength of steel, yet is truly flexible. *More than a million* have been bought for industrial service of many kinds.

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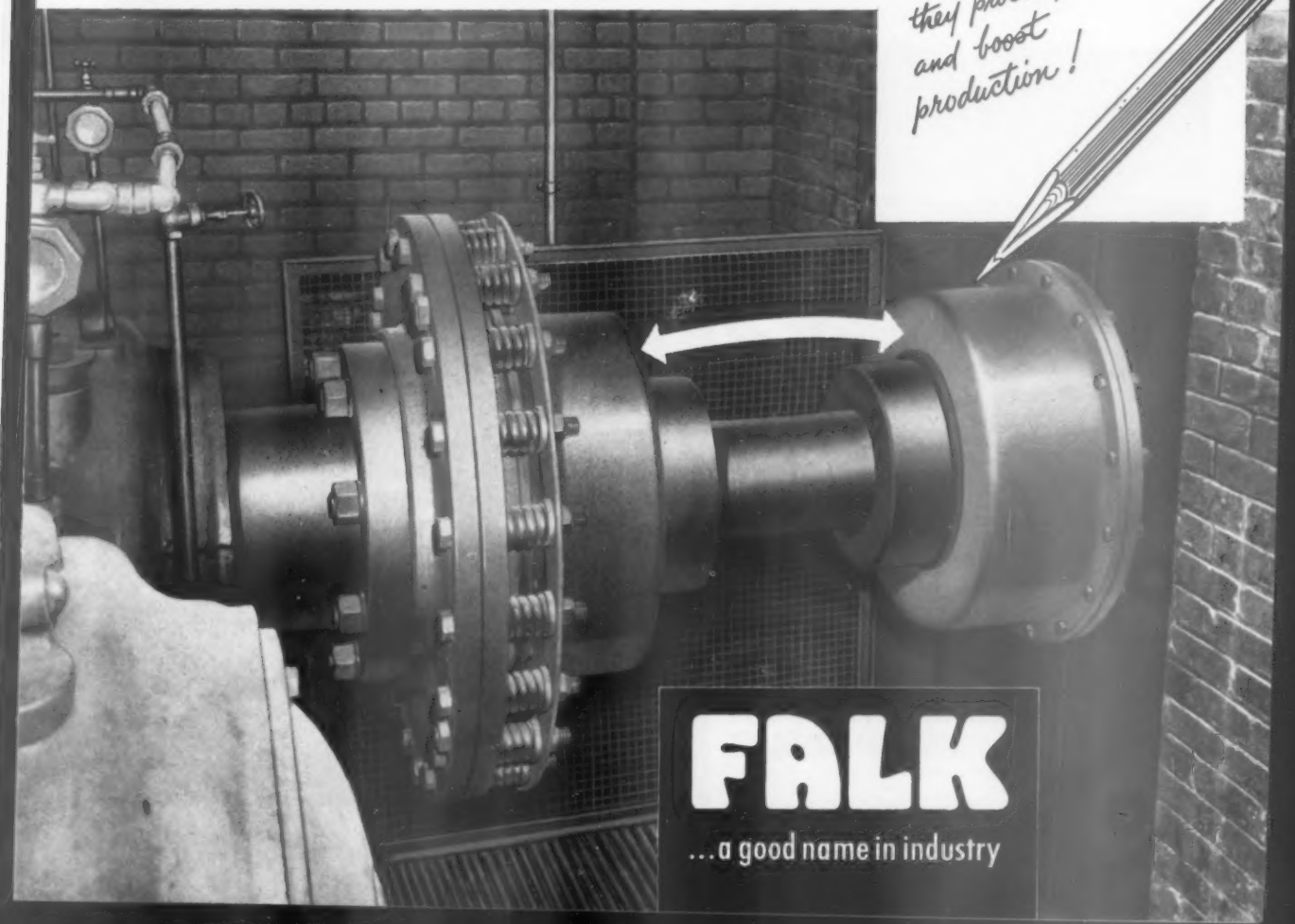
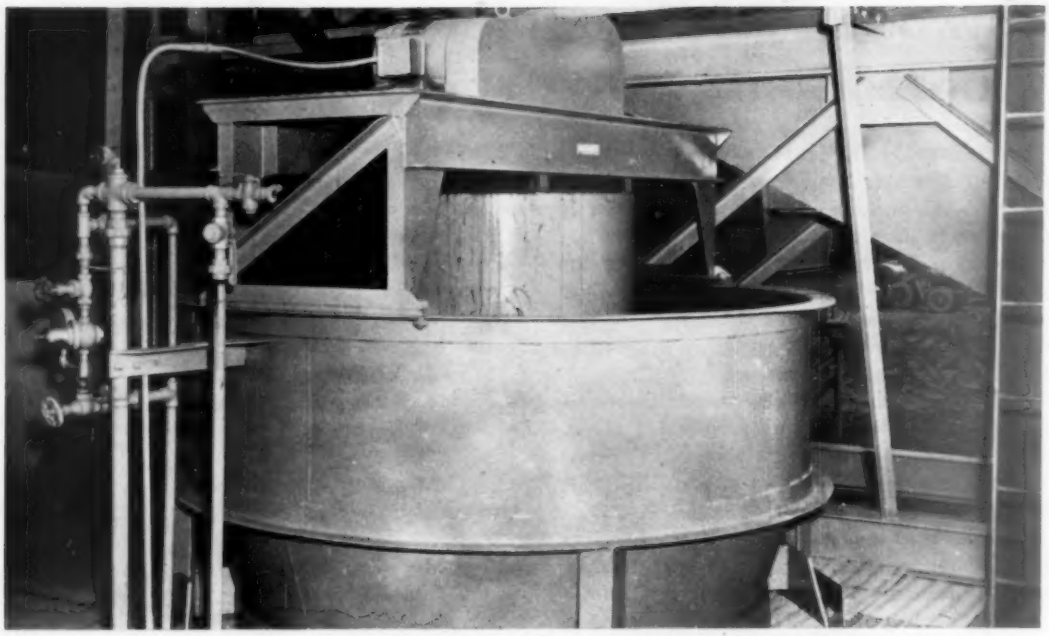
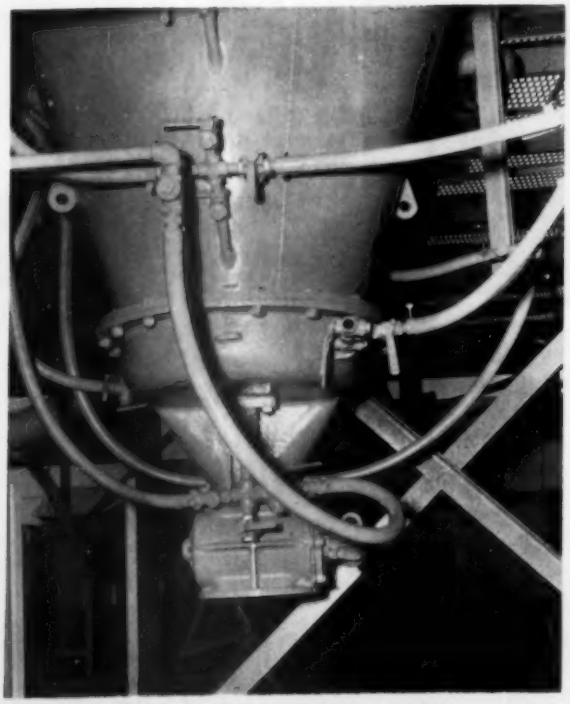




Upper part of the 7 ft. diam. separatory cone

Heavy media

continued from page 114



Lower part of the 7 ft. diam. separatory cone. Hoses are for the air lift that removes the heavies from the cone and for water to clear any obstructions. The big valve at the bottom is for draining the cone

At the outset it is the intent of the operators to process a 1¾ x 1-in. and a 1x½-in. gravel. A 7-ft. diam. separator cone is used which has a capacity of 60 tph. The media, which consists of 75 percent ground magnetite and 25 percent ferro-silicon is held at 2.40 sg. These thickeners are delivered to the site in sacks and drums for convenient handling. The "float" products, 15 to 18 percent of the feed, is white to gray in color, but the "sink" is much darker. The float often can be marketed, after re-crushing to produce fines, for crusher-run base and for stabilized road-base material.

Megascopic examination of the aggregate was made before the heavy-media separation plant was set up. The sample was separated into classes based on rock types and on physical condition relative to its use in concrete.

The aggregate was found to be composed primarily of acidic and basic igneous rocks, with fragments of sedimentary sandstones and silt stone and some shales. The secondary rocks, metamorphic gneisses, representing a very small percent of the total were included with the granites in the analysis.

The acidic rocks are resistant to the effects of differential thermal expansion. These are predominantly angular in shape, in sharp contrast to the subangular, moderately rounded particles of sandstone and siltstone. Granite and granodiorite fragments, which made up some 20 to 22 percent of the aggregate, appeared to be sound and free of

Please turn to page 118

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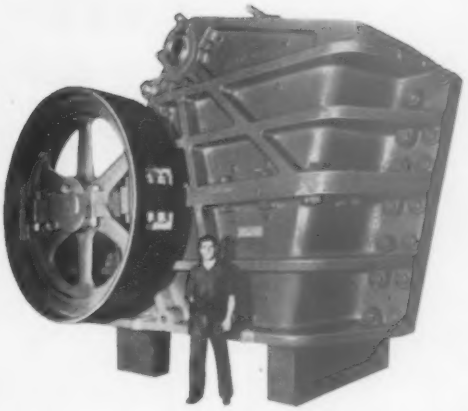
Long life—dependable service—low maintenance—minimum power—high production—make KENNEDY Jaw Crushers the first choice of all who buy because of proven performance and low year-to-year cost.



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- Massive, one-piece, arc welded steel plate frame.
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- Wide range of sizes from 10″ x 36″ to 36″ x 42″.

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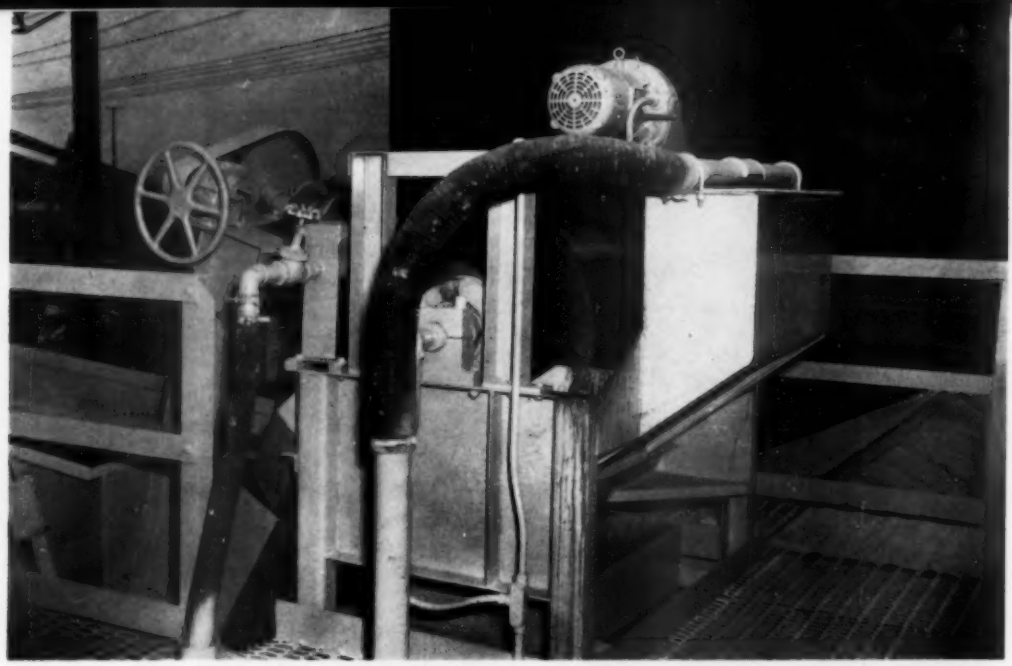

The magnetic drum segregates magnetic from nonmagnetic foreign solids

Heavy media

continued from page 116

The light colored material shown here is the Float and the darker is the Sink

any evidence of weathering or chemical deterioration. About 22 percent of the aggregate is made up of igneous rock of the basic type. Well-rounded, uniform sandstone and siltstone made up a high percentage of the sample examined. The porosity of the sandstone fragments appeared to be 5 to 10 percent.

About two percent of the sample examined consisted of well-rounded fragments of an argillaceous variety of sedimentary rock; by far the most undesirable material in the sample. Acceptable varieties of chert to the extent of about one percent were in the sample. No true shales, clay ironstone or other deleterious material were found.

The flow diagram shows the essentials of the Saticoy heavy-media separation plant. However, two slightly different techniques were introduced. First, washed and previously prepared gravel is conveyed to a vibrating screen ahead of the separatory cone. This gives the gravel an added rinse to remove the last traces of clay from the material. This screen is a departure from most heavy-media separation plants in the gravel industry but may prove to be a good pattern for others to follow.

A second innovation is the use of direct reading, dial-type scales for specific gravity determination. To control the density of the media, the operator fills a liter measuring flask and weighs the material. On older types of dial scales the indicated net weight would have to be translated into specific gravity from tables. These scales read direct.

ROCK PRODUCTS was one of the first magazines serving this field to publish data on heavy-media separation. For a more detailed description of the process, refer to the following issues: October 1948, page 100; Nov. 1951, page 64; July 1952, page 60; Nov. 1952, page 82; April 1953, page 96; Feb. 1953, page 89; July 1953, page 56; March 1954, page 88; February 1955, page 68; Aug. 1956, page 174; Nov. 1956, page 74; Oct. 1956, page 100.

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Pump, 3-in. wash water pump	Western Machinery Co.
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Wash screen, 4x16 ft. "sink" and "float"	Allis-Chalmers Mfg. Co.
Magnetic separator, 30x36 in. drum-type	Dings Magnetic Separator Co.
Air compressor	Chicago Pneumatic Tool Co.
Control valves (Rubber-Pinch)	Mine and Smelter Supply Co.
Pulp scales, Marcy	Mine and Smelter Supply Co.
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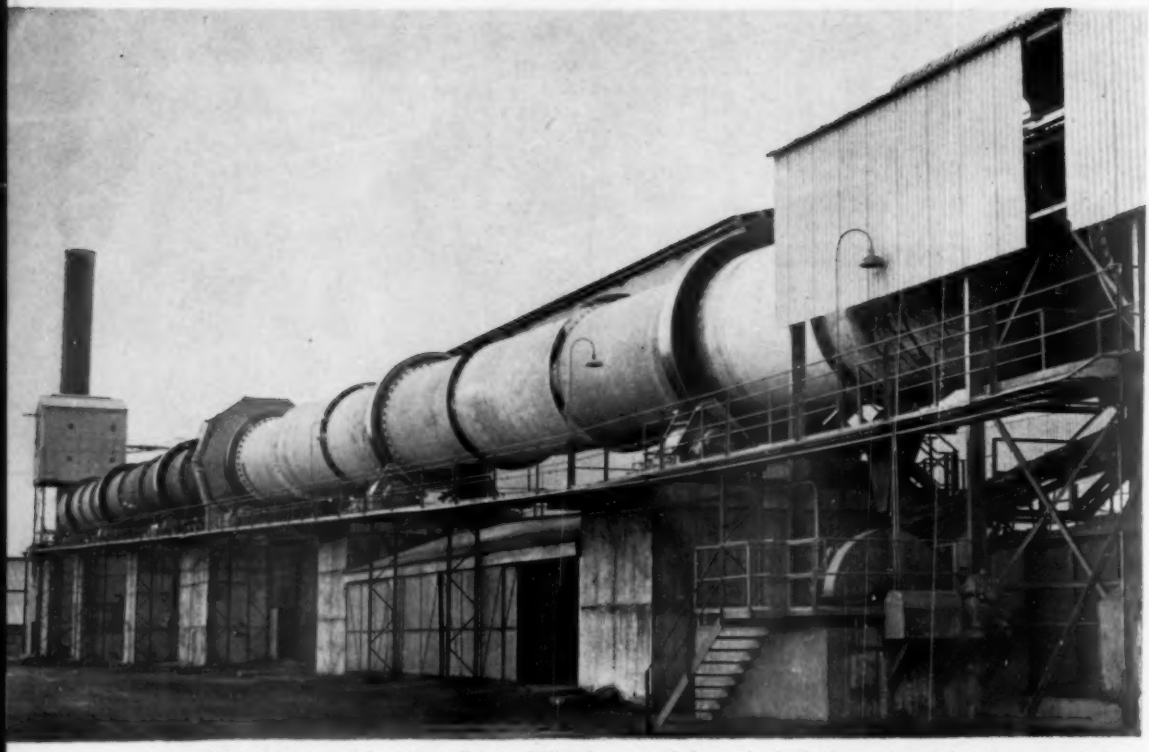

With this rotary kiln (11 ft. 2 in. x 440 ft.), most of the author's field experimental work was carried out

Part 1 of a series

Tire-roller placement determines rotary kiln performance

By H. H. WIGHT*

WITH A LONG KILN, over 400 ft., many design factors become apparent that would be hard to detect with a shell 150 ft. long and carried by only two tires. Some kiln designs use tires that are not all the same outside diameter; this may have the effect of placing the base plates of the corresponding rollers in different inclined planes unless extension spacing frames are used.

Better accuracy in installation can be achieved when all roller base plates lie in one inclined plane, which must be parallel to the axis of the shell of the kiln. It is better if this parallelism applies to the axis of the shell when hot.

It is the shell axis, rather than the tire axis, which must be the controlling factor; this becomes more apparent with worn equipment. The true cost of tire and roller maintenance can be gauged only after 10 to 15 years of operation, and this design simplification will increase the life of tire-roller assemblies considerably.

As in Fig. 1, each pair of rollers can be mounted

*H. H. Wight, M.E., B.S., AMIE (Aust.), AFAIM, is chief engineer for Adelaide Cement Co., Ltd., Port Adelaide, South Australia

Please turn to page 123

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The Rock Service is built with FLEX-RITE NYLON cords that withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: more retreadable Rock Service tires. Double-chevron cleats give maximum traction and skid resistance in forward or reverse. Sidewalls defy bruises, grooves expel stones.

B.F.Goodrich Tubeless construction runs cooler, protects against punctures, cuts maintenance costs, is easier to service.

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No unnecessary failures thanks to bruise-resistant tread and sidewalls, uniform flexing, cooler-running tubeless construction.

Greater traction—the double-chevron tread digs in and pulls in forward or reverse. Sharp cleat angles defy dangerous skids.

FLEX-RITE construction means the Rock Service is not distorted when inflated. No tire-killing stresses. Instead, uniform flexing.

More retreads, because FLEX-RITE NYLON cords withstand double the impact of other materials, resist heat blowouts, flex breaks.

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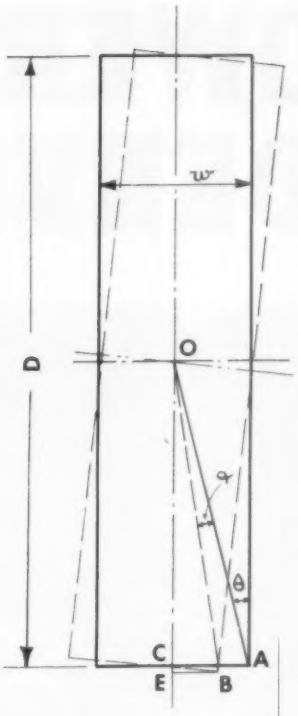

Fig. 1. Each pair of rollers can be mounted astride the erection centerline with accuracy

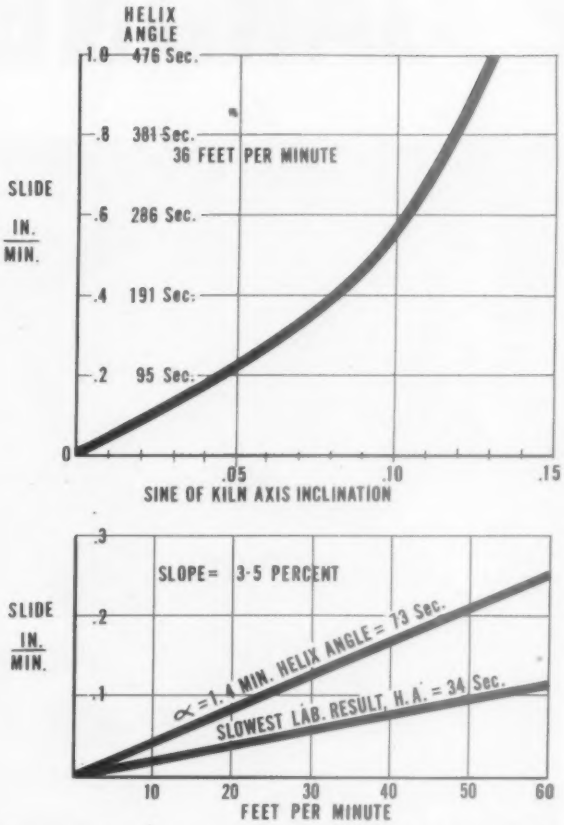

Fig. 2. Axial thrust that will be exerted by a roller on a tire for a certain surface speed can be calculated from the helix angle, or rate of slide

Tire-roller placement

continued from page 120

astride the erection centerline with good accuracy. The centerline used for foundation construction need be only relatively approximate, but the erection centerline must be precise. A further step in erection is to move the roller adjusting screws so that each roller is parallel to this precise centerline. Sequence of erection of the kiln shell will probably, in turn, rest the tires on their pairs of rollers, and shell alignment can then rely on the precise centerline.

Small, transverse movements of rollers can be made to allow for constructional variations in tire or roller diameters or in base plate shaft height, so that the centerline of the shell can be made straight. It is most important that the initial, precisely parallel setting of any roller is not altered merely because a tire does not seem to produce a flat contact against a roller. When the kiln shell is complete, and before placing the brick lining, it is possible to drive the shell. From this rotation any correction of roller settings may be made. It is necessary that the roller bearings be thoroughly "run in" before the load of brickwork be added. A good procedure would be to require the manufacturer to partially "run in" each roller on its base plate before the units leave the shop. This would assist the field erection.

It is clearly impossible to mount the tire sections of a kiln into the shell so that they are exactly at right angles to the kiln axis. All tires will be found to possess a certain amount of axial weave, and for a tire 15 ft. diam. this may measure $\frac{1}{8}$ in., but it should not be much more. This weave angle of $\frac{1}{8}$ in. in $7\frac{1}{2}$ ft. equals one in 720, which is 4.8 min. of arc.

Assuming that all tire roller units are to be run with dry surfaces, the angle by which a roller must be skewed from the initial, precise and parallel setting is about 1.4 min. of arc. For surfaces with a really good surface finish the angle is somewhat smaller. Since the 4.8 min. (plus or minus 2.4 min.) is greater than the 1.4 min., it will be evi-

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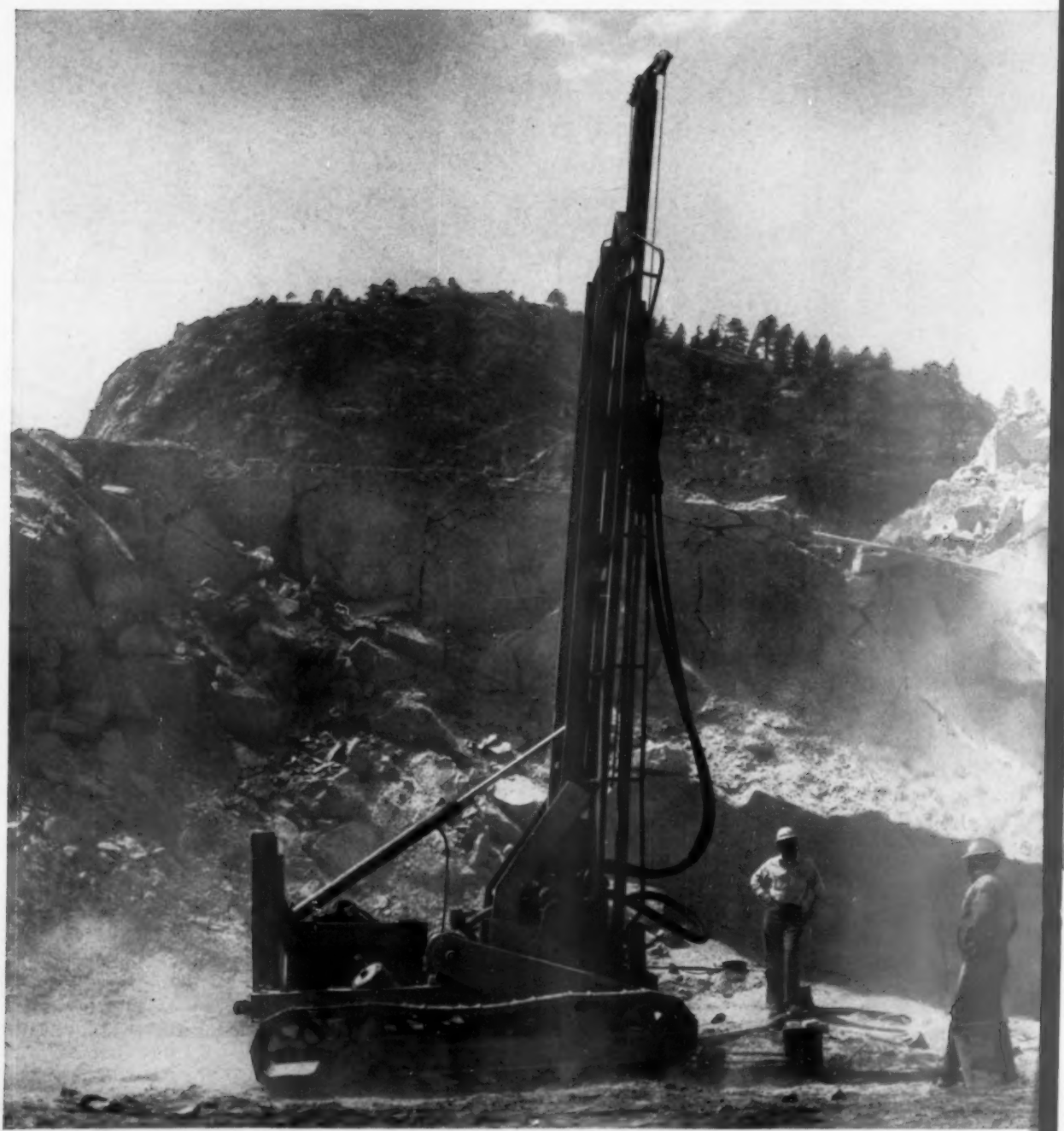

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Fig. 3. Roller burnishing is caused by the slide of tires across its surface

Tire-roller placement

continued from page 123

dent why roller adjustments can be made only from rotation of kiln. To push the kiln uphill, the end of the roller shaft on the side where the tire surface is moving down must be moved outwards, and the lower end must be moved inwards, using equal movements.

This skewing is required to balance the downhill slide of tires across rollers whenever the shell rotates. Under laboratory conditions this slide has been examined over a wide range of values of surface fpm., inclination of axis, loading per inch of contact line, and surface finish, establishing families of curves.

For dry profiles these curves are straight lines when slide is plotted against surface fpm., for various slopes or end pressures. They are straight only up to a slope of six percent, when slide is plotted against slope, for various surface speeds. Rates of slide become very high as the coefficient of translational friction is approached, that is, when circumferential travel tends to zero.

From the laboratory work it was proved that for a given inclination of kiln, rate of slide is proportional to kiln rpm., or to fpm. of tire surface. Inclination of kiln axis merely creates an axial loading. So for a given axial loading, the tires of a kiln will slide across the rollers in a helix, the angle of which is independent of the rotational speed. Since both the slide of kiln tires and the effect of a skewed roller (the "helix effect") produce helical tracks of constant angle, contact of kiln against a thrust roller will not be affected by variations in kiln operating, rotational speed.

Even the smallest axial pressure causes an axial slide. This is true for slide rates as low as .0001 in. per min. (1 in. per week), with tire surface speed down to 1 fpm.

The helix angle can be obtained from the angle by which a roller is skewed on the bed plate. From this helix angle the axial thrust that will be exerted by a roller on a tire for a certain surface speed can be calculated (see Fig. 2). The sine of inclination is the ratio of axial thrust to kiln weight, and any particular thrust produces a corresponding axial slide, or angle of helix. Relationships for two values at helix angle are shown in Fig. 2.

The rate of slide, or helix angle, is almost independent of the contact pressure between tire and roller as measured in pounds per inch of contact line. The actual contact area is a rectangle for parallel axes, and an ellipse for skewed axes. But a complete ellipse will fit into a normal roller width only when skew is greater than 20 min. and when the contact area is independent of the angle of skew, for the deformation is mainly plastic.

To provide a better background for axial slide, a similar slide was measured when a braking torque was applied to a roller shaft. This slide was then a backward, circumferential travel, of very similar magnitude, proving that if the loading were either axial or circumferential, upon rotation an immediate slide occurred of one surface past the other. Thus, probably in any frictional drive there is a slide in evidence while the surfaces are moving: That is fundamental for the production of the drive.

The skewing of a roller causes it to trace a helical path around the tire, and the two rates of axial travel can be made to agree with very high accuracy. But the slide rate of tires across new rollers is many times the slide rate that will apply when all surfaces have become polished. So the initial, precise setting of all base plate adjustment screws must be carefully scribed, then a skew of about three times the final value given to all the new rollers.

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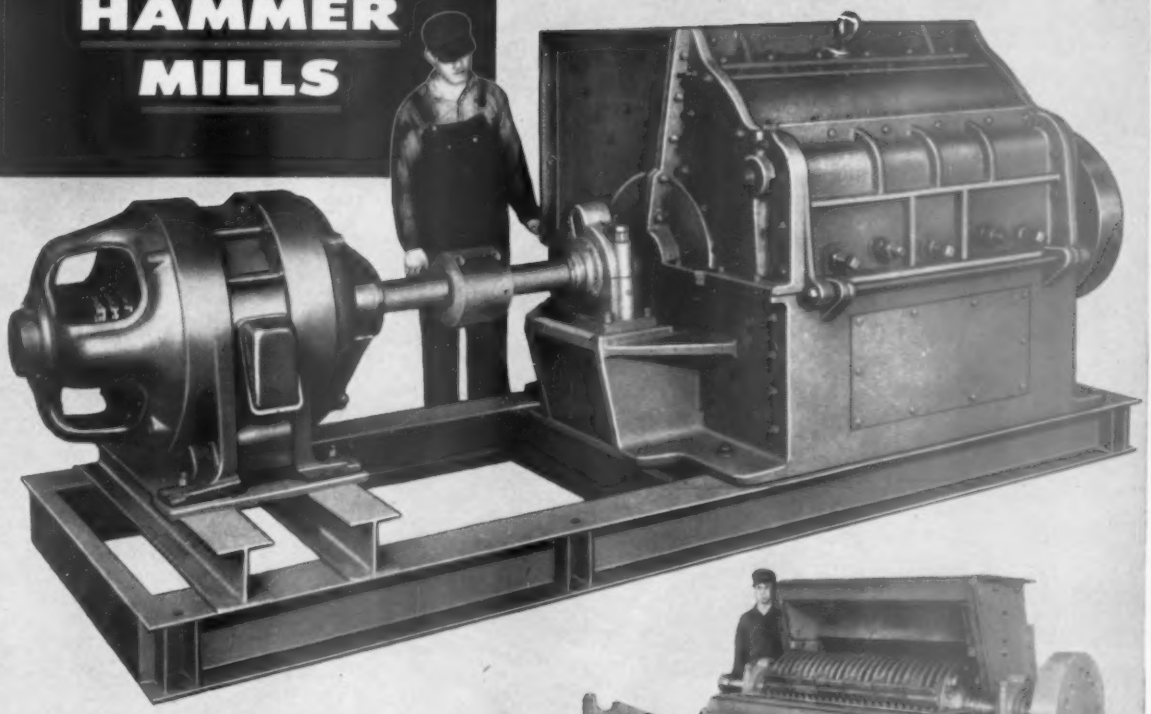

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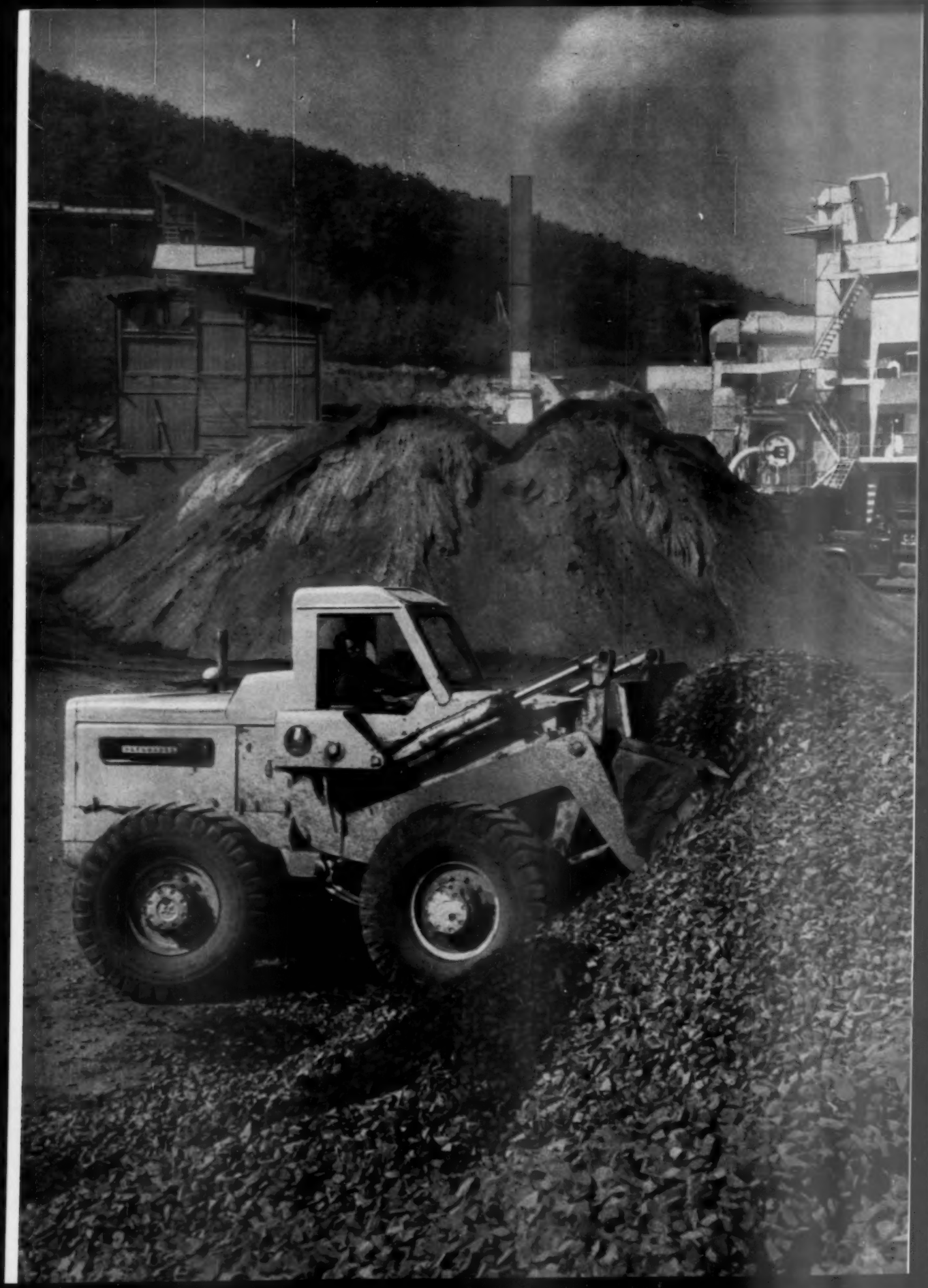

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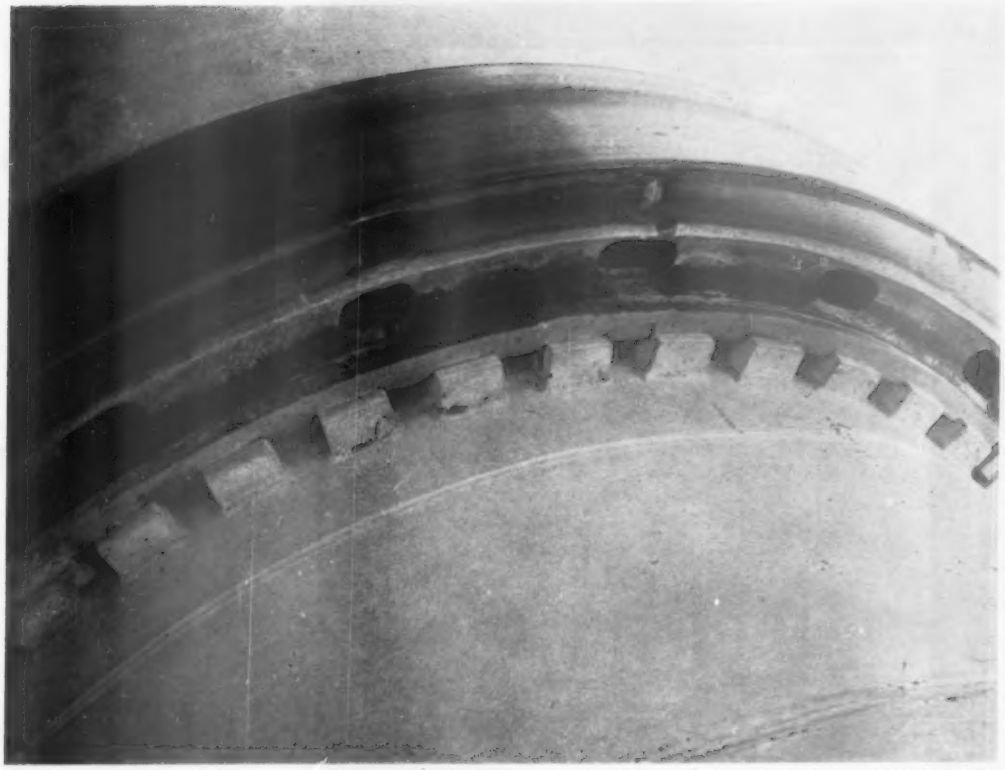

Fig. 4. The conical edge of the thrust tire that contacts the thrust roller is polished; the lower dull portion shows that the thrust tire is weaving and contacts the upper thrust roller for only a small part of a kiln revolution

Tire-roller placement

continued from page 126

Continued shell rotation will shear the high-spots off the profiles of tires and rollers rapidly, and the skew of each roller is then steadily decreased so that the thrust tire of the kiln is kept at a light contact with the bottom thrust roller; that is, it touches for about one-quarter of a revolution of the kiln. This tire slide constitutes roller-burnishing which is shown in Fig. 3.

The screws for roller adjustment are usually mounted against the outsides of roller base plates; this is satisfactory for only a few months of operation. As time passes, the roller base plates will grip the bed plates more strongly, until it will be quite difficult to move some of them. Occasionally it will be found that a base plate will not move out to follow an adjusting screw when this is turned a little, so it is best to mount adjusting screws against the inside faces of roller base plates as well. It would be well to fit grease leads up through the bed plates to the surfaces carrying the base plates so that lubrication could be continued without having to dismantle the assembly.

Tire weave determines the relative assembly of a pair of thrust rollers. If the kiln drive incorporates a thrustor-operated, double-shoe brake to prevent runback, the reasoning behind the setting of an assembly becomes simplified. For the amount by which the kiln shell may travel axially, between contact on the top thrust roller and contact on the bottom thrust roller, the "float" between thrust rollers may be considerably reduced. This "float" need be sufficient only to accommodate the weave of the thrust tire, plus a margin of about $\frac{1}{4}$ in.; that is, a minimum of $\frac{3}{8}$ in.

If a kiln is permitted to "run back" each time that power to the driving motor is cut off, this float should be increased to about $\frac{5}{8}$ in. For as a kiln runs back due to the torque of the feed mate-

Please turn to page 176

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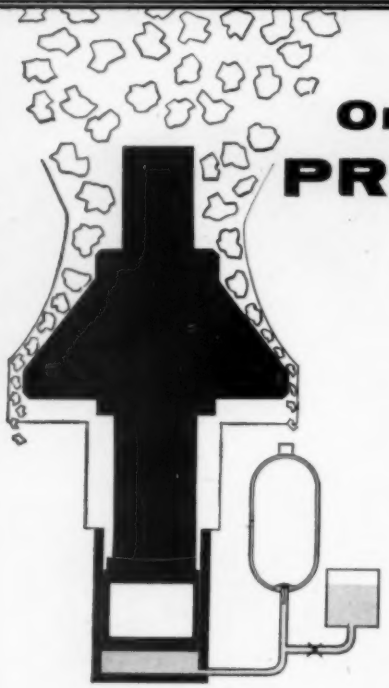

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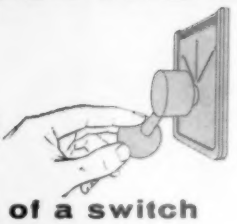

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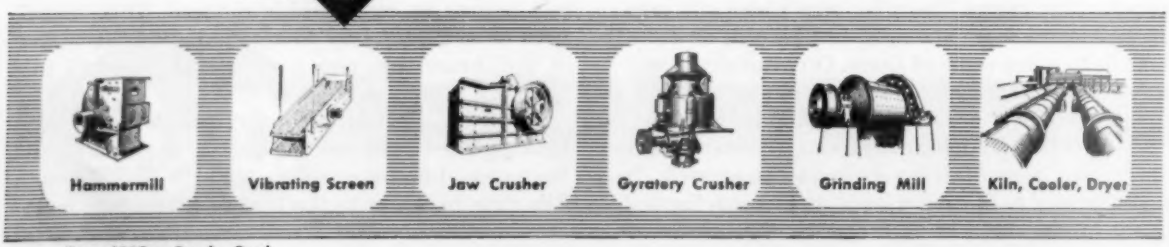

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Moisture separator contains porous filter. Air flows tangentially through separator, and water is expelled through drain at bottom of receptacle

Excessive water causes wear, sediment and bursting in compressed air lines

How to keep water out of air lines

By A. N. GUSTAFSON*

WET COMPRESSED AIR is an expensive nuisance. It can rust air tools and cause excessive wear by washing off the lubricating film from wearing surfaces. It carries dirt and sediment through pipes and collects in low spots, causing "water hammer," which jars scale, rust, or dirt in the lines loose. When exposed to freezing temperatures, it can plug or even burst piping.

How does water get into compressed air lines? How can it be kept out? The answers to these questions become increasingly important as compressed air is used by practically every company to power a growing number of tools, machines, and pneumatic diaphragm valves and controllers. It is therefore important that every plant engineer understand the factors which affect the moisture balance of compressed air, and the techniques for eliminating undesirable water from air lines.

All atmospheric air contains some moisture. The ability of air to retain vaporized water increases as the temperature is raised, and decreases as it is cooled. Relative humidity is directly related to temperature. For example, air which has a relative humidity of 80 percent at 70 deg. F. would be only 40 percent saturated at 90 deg. F.

Pressure has the opposite effect. The ability of air to retain water decreases as pressure increases. The more it is compressed, the less water air can hold, the more water it precipitates.

In a compressed air system, air enters the compressor at ambient or atmospheric pressure and temperature. It is then compressed to a higher pressure. While this raises the temperature, the air is never used at the temperature of compression. Heat is dissipated through the cylinder walls, through the air lines and the receiver to the surrounding atmosphere, and, if an aftercooler is used, to the cooling water in it. As the air then travels through the tubing, pipe or hose to the point of use, more heat is lost, and the temperature is reduced further—possibly to room temperature or below.

These changes in temperature and pressure are responsible for the condensation that occurs in any compressed air system, even in dry climates. For example, if free air at 50 percent relative humidity were compressed to 100 psi. and cooled to room temperature, it would then have a relative humidity of 400 percent. Any further compression or cooling would precipitate water in the lines.

Moisture is much more of a problem when the climate is humid. On a hot, muggy summer day it is not unusual for as much as 2 gal. of water

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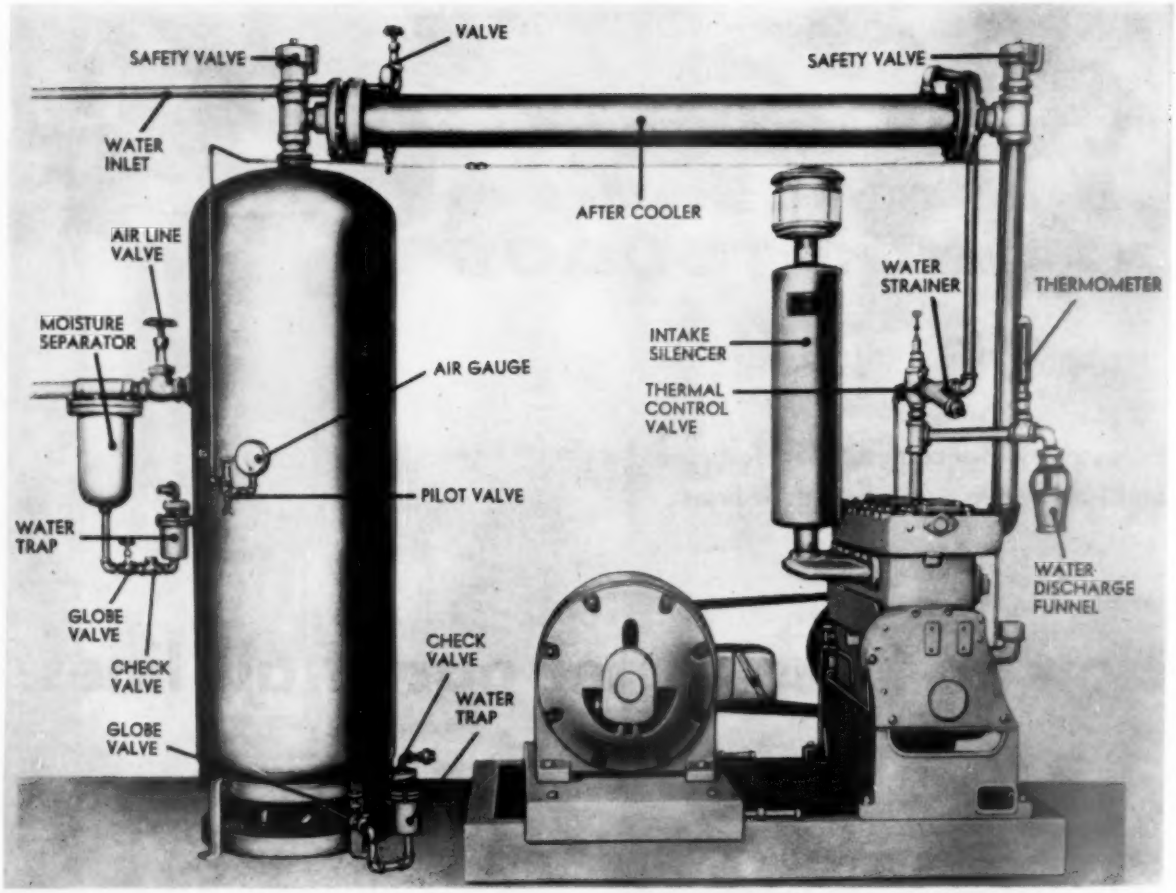
*Chief engineer, Schramm, Inc., West Chester, Pa.



Where completely dry air is needed, this system eliminates moisture. Aftercooler is located between compressor and receiver. Most of the water falls out in the receiver, leaving less for the separator to remove

Compressed air lines

continued . . .

to condense in an hour. A typical case will show how so much water can be freed by compression.

Suppose that it is a hot, humid day—the temperature is 90 deg. F. and the humidity is 80 percent. A compressor is delivering 200 cfm. to a sand blast at 80 psig. Each cu. ft. of atmospheric air at these conditions contains .00175 lb. of water. Since 200 cfm. are drawn into the compressor, the total water intake in a minute is .35 lb. This wet air is then compressed to 80 psi.

Compression heats the air so much that it will carry all the moisture as suspended vapor. The full amount of water is therefore passed through the compressor. This warm air then cools in the receiver and in the air lines. When it reaches room temperature (90 deg. F.) it will be much more saturated, and about 80 percent of the moisture will condense. This means that about .28 lb. of water per minute, two gph. will be deposited in the receiver and the air lines—enough to make the air really wet.

There are several ways to eliminate this water from air lines. In all cases, correct piping and draining will help. Where this alone is not adequate, aftercoolers can be employed to condense the water before the air is distributed. And for unusual applications where cooling water is not available, or where air lines must pass outdoors through freezing temperatures, special desiccant dryers may be used. Since the first two methods are used in the majority of installations, they will be discussed in detail here.

Correct piping and draining will often provide reasonably dry air at the point of use. Even though additional drying methods are used, attention to installation details will help to provide air that is satisfactory.

One of the simplest and most effective ways to

Please turn to page 136

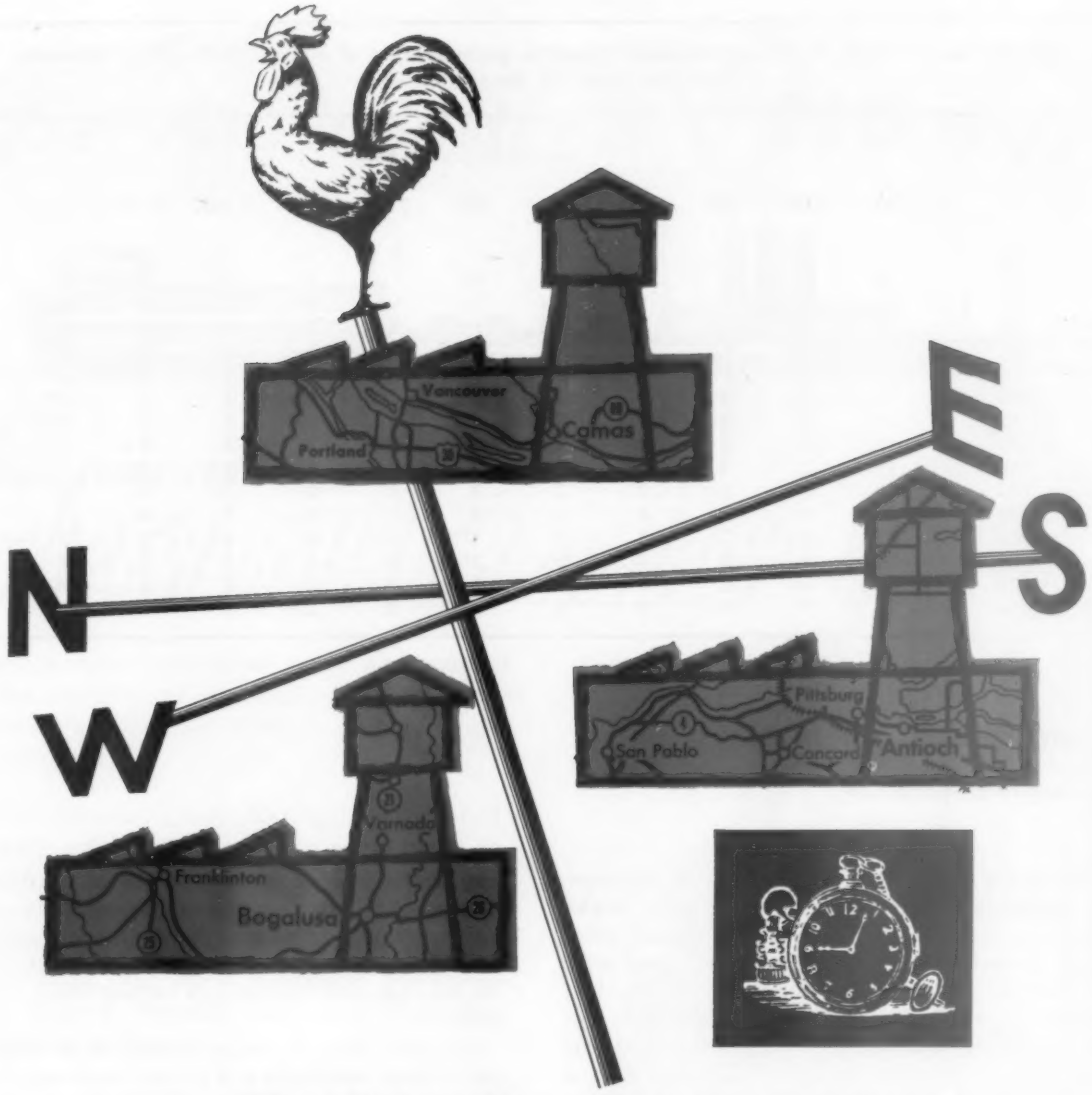


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Table I. Pipe diameter (in inches) required to pass a given amount of air at 100-lb. gauge pressure with less than 1 lb. drop in pressure

Cu. ft. free air per min.	Length of pipe in feet										
	50	100	200	300	400	500	750	1,000	2,000	3,000	5,000
20	¾	¾	¾	1	1	1	1	1¼	1¼	1¼	1½
40	¾	1	1	1¼	1¼	1¼	1¼	1½	1½	2	2
60	1	1	1¼	1¼	1¼	1½	1½	2	2	2	2½
80	1	1¼	1¼	1½	1½	1½	2	2	2	2½	2½
100	1¼	1¼	1½	1½	2	2	2	2	2½	2½	3
125	1¼	1½	1½	2	2	2	2	2½	2½	3	3
150	1¼	1½	2	2	2	2	2½	2½	3	3	3½
175	1¼	2	2	2	2	2½	2½	2½	3	3	3½
200	1½	2	2	2	2½	2½	2½	3	3	3½	3½
250	1½	2	2	2½	2½	2½	3	3	3½	3½	4
300	2	2	2½	2½	3	3	3	3	3½	4	5
400	2	2½	2½	3	3	3	3½	3½	4	4	5
500	2	2½	3	3	3	3½	3½	4	5	5	5
600	2½	3	3	3½	3½	3½	4	5	5	5	6
800	2½	3	3½	3½	4	4	5	5	5	6	6
1,000	3	3	3½	4	4	5	5	5	6	6	8

Compressed air lines

continued from page 134

decrease air contamination and increase compressor efficiency is to locate the compressor intake carefully. For efficiency, the intake should preferably be outside the building, on the coolest side. Because this cool outside air is more dense than indoor air, a greater quantity of air will be delivered to the compressor. For example, if the outside air temperature averages 40 deg. F. and the indoor temperature is 70 deg. F., only 943 cu. ft. of outdoor air will be needed to deliver the same weight as 1,000 cu. ft. of indoor air—a direct saving of nearly six percent. The greater the differential between outdoor and indoor temperatures, the greater will be the economy.

Avoid locating the intake near steam or air exhaust vents, which would add moisture to the air. The location should also be free of fine industrial dusts or pigments or any other source of contamination. Sulfurous or chlorine-contaminated atmospheres mix with moisture to produce weak acids, which will attack screens, tools, and piping.

If the receiver is the vertical type, air should enter at the top, so that moisture can fall directly to the bottom, where it will collect. The outlet from the receiver should be in the shell, near the top. A drain must be installed in the bottom of the receiver, and should be opened daily to remove all accumulated water.

If automatic drainage is desired, an automatic trap can be used—preferably of the inverted bucket type. A similar arrangement should be used with horizontal receivers. The entrance should be at the head; the outlet should be in the shell, on the top side near the head. A bottom drain is also required.

Air lines must be large enough to handle demands from machines and services without excessive pressure drop (see Table I). These lines should be slightly pitched so that any moisture that condenses will flow in the same direction as the compressed air. At the end of the line, or at a low point in the line, a drop leg should be installed to collect condensation. Either a hand valve or an automatic trap can be used to drain this leg.

Service lines for tools or services should be taken from the top of the main. Although this arrangement usually requires the use of two elbows, it will guarantee that air taken from the main will be dry. Any condensation in the main will flow by on the bottom. Use a check valve wherever there is any chance of liquids backing into the system from other sources, such as in air-purging systems. To remove any remaining water from the air before use, a moisture separator is usually installed in the service line immediately ahead of the point of use. Air will then be practically dry.

Please turn to page 138

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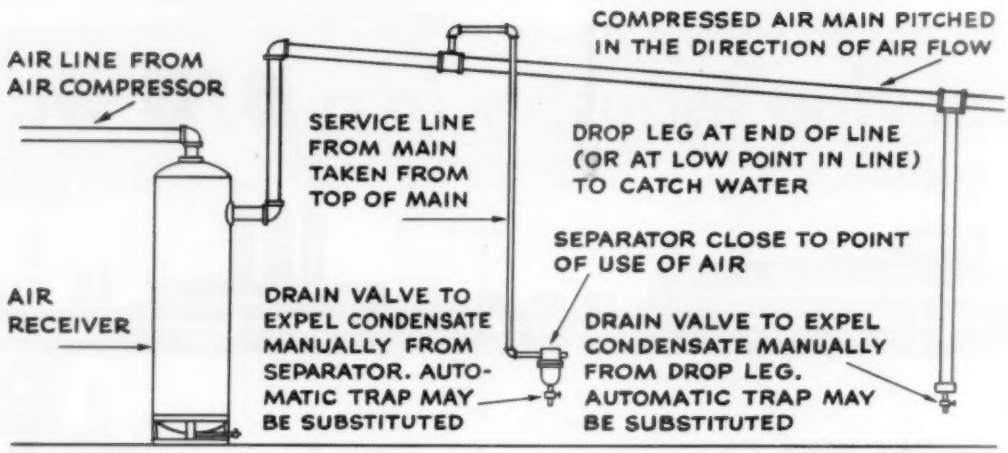
COMPRESSED AIR MAIN PITCHED IN THE DIRECTION OF AIR FLOW
AIR LINE FROM AIR COMPRESSOR
SERVICE LINE FROM MAIN TAKEN FROM TOP OF MAIN
DROP LEG AT END OF LINE (OR AT LOW POINT IN LINE) TO CATCH WATER
SEPARATOR CLOSE TO POINT OF USE OF AIR
AIR RECEIVER
DRAIN VALVE TO EXPEL CONDENSATE MANUALLY FROM SEPARATOR. AUTOMATIC TRAP MAY BE SUBSTITUTED
DRAIN VALVE TO EXPEL CONDENSATE MANUALLY FROM DROP LEG. AUTOMATIC TRAP MAY BE SUBSTITUTED

Less critical installations can be furnished reasonably dry air without cooling by proper piping and drainage

Compressed air lines

continued from page 136

Completely dry air can be obtained by reducing the dewpoint of the air—before distribution—to a value lower than the lowest temperature that the air will encounter in any part of the system.

Dewpoint can be defined as the compressed-air temperature below which water vapor begins to condense. If air is cooled below this temperature, water will be precipitated, and the dewpoint will stay at the lowest temperature to which the air has been subjected, provided that all of the released water has been trapped out. This water must be removed, or it will vaporize again.

An aftercooler can be used for dewpoint reduction. This consists of a nest of tubes in a shell. Compressed air is passed through the tubes and cold water is circulated over and around them. Aftercoolers may be mounted either vertically or horizontally for best space utilization or simplest piping. Water flows through the aftercooler in a direction counter to the air flow, so that the water inlet is at the air discharge end of the cooler. Automatic valves may be used to control the water flow. Discharge water from the aftercooler can then be used for compressor cooling.

Air from the aftercooler enters the head of the receiver and the drops of water fall to the bottom where they are drained out. A thermometer in the cooler outlet permits the operator to make certain that the correct amount of cooling water is being used. For protection, a pop safety valve must be placed between the compressor and the aftercooler, and between any possible source of obstruction in the air lines.

The proportions of a good aftercooler are such that the air will be cooled to within 10 deg. F. of the cooling water temperature with a flow of one to two gpm. for each 100 cu. ft. of air that is compressed to 100 psi. With an aftercooler designed according to this principle, water at 75 deg. F. or below would be adequate to completely dry the air in the previously described sandblast installation, where 2 gph. were condensed on a humid day.

Any water carried through the receiver can be removed by a moisture separator. The type illustrated consists of a cylindrical chamber into which the air flows tangentially, producing a swirling motion. The drops of water, which are heavier than air, are thrown to the walls of the chamber. From here they run down into the drain at the bottom of the separator, where they are expelled automatically by a trap, or manually by a valve. The air flows through a filter made of porous material which permits the passage of air, but prevents the passage of water and oil.

When the separator is located at the outlet of the aftercooler, it may be overburdened, for it will have to remove all of the moisture. It is better practice to place it in the line from the air receiver. When this is done, much of the moisture will first drop out in the receiver, leaving less work for the separator. The result will be drier air.

By realizing these characteristics of compressed air, and by properly applying the drying techniques discussed here, it should be possible to eliminate costly water from practically any compressed air system. Work will be improved, the system will be more efficient, and the life of air tools and air piping will be lengthened.

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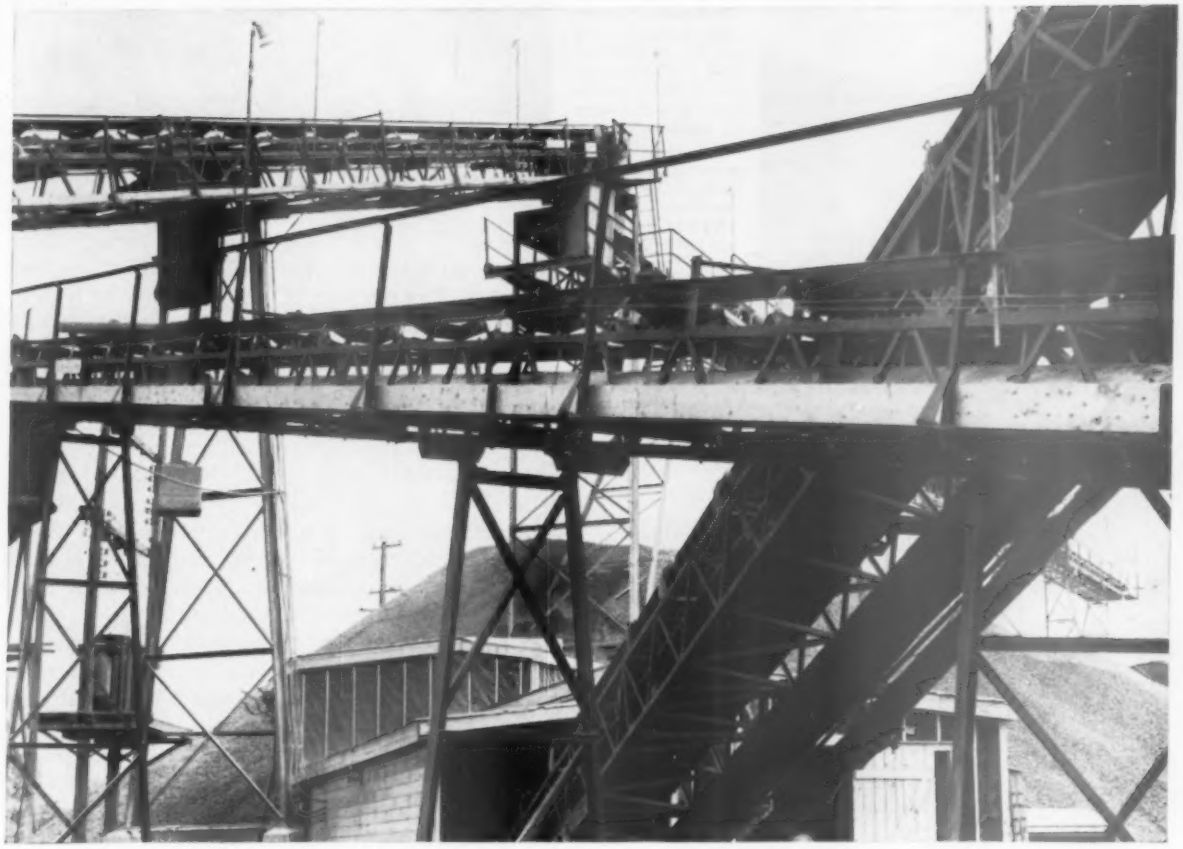

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Constant change is typical of construction jobs. And the St. Lawrence Seaway operation is another proof of the flexibility of Barber-Greene Conveyors. Made of standardized components, Barber-Greene Conveyors meet changing needs . . . satisfy the demands of faster delivery and erection with least expensive engineering time.

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To expand or not to expand?

You can take guesswork out of your decision by using this formula for calculating profits

By SAM RUVKUN*

SUPPOSE YOU ARE THE OPERATING HEAD of the Rock Products Sand and Gravel Co., and that your directors are thinking of expanding operations. You have been given the responsibility of preparing a recommendation concerning the proposed venture. How would you go about it?

Your first step is to prepare a "feasibility report"—a collection of data on markets, financial conditions, production costs, capital investment, and manpower from experts in each department. The most important part of the feasibility report is the coordination of this information.

*Vice president, Henry J. Kaiser Co.

First, let's review the reasons behind the assignment. The purpose of an expansion or a new undertaking is to realize a profit. The directors will want to know how much the project will make and how it compares with other ventures the company could undertake with the available funds or by potential borrowings.

The feasibility study reveals the results of the detailed estimates of construction costs, and the detailed estimates of operating costs, and from this you can determine the projected profit. Not so readily apparent is the relative position of this scheme as compared to other schemes unless some standard is established by an operating firm. One standard used by many firms is payout time in years. This is derived by projecting the profit and loss picture for the expansion program and comparing it with the estimated capital investment of the project. Some firms prefer to see profits as a percentage of the investment; still others consider profits as a percentage of sales. Either scheme can be satisfactory as long as it is utilized consistently —so that the answer obtained from a feasibility study will permit management to evaluate the relative profitability of a project based upon experience with other investments. Only by establishing a standard for comparison can the executive be assisted with profitability calculations and eliminate unprofitable ventures from consideration.

We will consider the "payout time" as a primary measure of the relative profitability of a venture. However, each firm in the minerals industry should establish its own standard of profitability to use as a primary guide for undertaking an expansion. But other criteria must be considered too:

- The possibility for future expansion after the project is undertaken, and its effect on the cost of this new project.
- The possibility of oversupplying the market by this new project.
- The amount of risk involved—accuracy of the estimates of markets and operating and capital costs.
- The possibility of a greater return on another project.
- The availability of management personnel to execute the proposed new project.
- The availability of financing.

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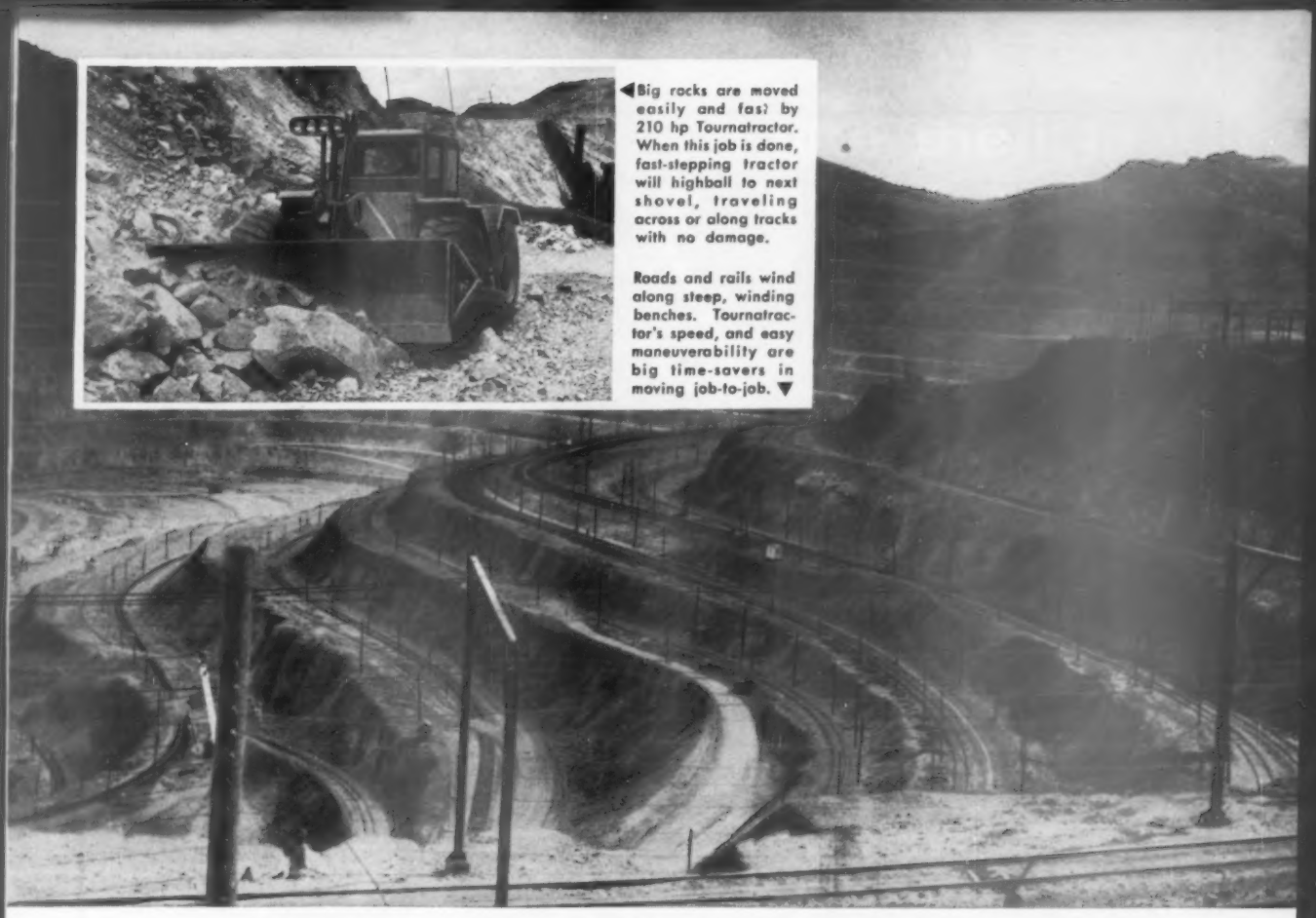

◀Big rocks are moved easily and fast by 210 hp Tournatractor. When this job is done, fast-stepping tractor will highball to next shovel, traveling across or along tracks with no damage.

Roads and rails wind along steep, winding benches. Tournatractor's speed, and easy maneuverability are big time-savers in moving job-to-job. ▼

rubber-tired tractors end rail, crawler damage ...speed pit clean-up

At a major southwestern copper mine, four speedy 210 hp LeTourneau-Westinghouse Tournatractors® have solved a serious rail and crawler damage problem — and are paying their owners other substantial performance dividends.

The problem: ore blasting often buries sections of the more than 50 miles of railroad track in the pit. When crawler-type tractors had the job of dozing away debris, they regularly damaged ties, rails, and their own crawler tracks. Today, rubber-tired Tournatractors handle this assignment with *no* damage. Their wide, low-pressure tires flex harmlessly while rolling over track installations... never throw rails out of alignment... never block switches, or chamfer ties.

Faster shovel-to-shovel travel

Superintendents at the mine report that, in addition to solving this problem, Tournatractors have demonstrated two other important work assets: faster job-to-job travel speed, and unusual ability to work economically in rocky material.

Speed on travel between assignments is particularly important on this operation, because major task of Tournatractors is cleaning up around shovels spotted all along maze of over 150 miles of roads built on steep, winding benches. Tournatractor, with 2 to 3 times the speed of crawlers, produces major savings in work and travel time... gets more work done per day.

Less maintenance cost... less downtime

Tractor repair bills have also been cut, because tire-cushioned Tournatractors work over rocky surfaces without abrasion and shock damage. Crawlers, on the other hand, were a continual problem because of breakage and wear from rocks and grit in their track assemblies. Tournatractor's anti-friction drive is sealed, enclosed in rugged steel housings. Rocks and grit are sealed out, can't clog gears and rollers.

Maintenance of rubber-tired tractors has been easy, fast, economical. Operators report, for instance, that lube time is only one-third that needed for crawlers. These big LeTourneau-Westinghouse units are working long hours, too... one unit works 3 shifts a day, 7 days a week. Two others work 2 shifts a day. Downtime has been low. Strong, simple construction keeps Tournatractors working longer hours without breakdown.

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Where quality is a habit

FIG. 1

Example of a projected profit and loss statement

Item	Comments	Annual Cost or Profit
1. Estimated net sales	Assumed to be known from previous estimate	$
2. Estimated cost of sales	Assumed to be known from previous estimate	
3. Estimated gross profit	Item 1 less Item 2	
4. Estimated administrative and selling expense	Assumed to be known from previous estimate	
5. Profit before fixed charges	Item 3 less Item 4, assumed amount	$719,500
6. Fixed charge calculations:		
(a) Property tax and insurance	1% of capital cost*	10,000
(b) Interest on investment	4½% of the outstanding balance	40,500
7. Depreciation 4% of capital cost (25 years)**	Straight-line basis	40,000
8. Profit before income tax	Item 5 less Items 6 and 7	$629,000
9. Federal and state income tax***		
(a) State	3% of Item 8	19,000
(b) Federal	52% of Item 8 less Item 9(a)	317,000
10. Annual net profit after taxes		$293,000
11. Add back depreciation	From Item 7	40,000
12. Annual net cash return		$333,000

* *Rate shown is an illustrative example only.*

** *For this example, a 25-year depreciation period on the straight-line basis is assumed as the allowable time permitted by the Internal Revenue Service. The allowable depreciation period may be as low as 15 or 20 years. Note also that cost of land is excluded from the capital cost when calculating the depreciation allowance. Depletion allowance is permitted and presumed to be included.*

*** *Income tax rates for the various states differ. This example uses 3% only as an illustrative rate. Federal income tax rate shown is the current rate for corporations with profits in excess of $25,000 per year.*

To expand or not to expand?

continued from page 140

Profitability can be defined as the return on the investor's money in terms of the number of years over which the initial cash investment is paid back. This period is called payout time, the number of years required to accumulate enough cash to equal the original investment—after all operating costs (often called cost of sales) are paid, all allowable deductions are made for fixed charges, and an allowance is made for income tax payments. Fixed charges as used here refer to interest on borrowed funds, property taxes, and fire insurance. For the purpose of this article, fixed charges do not include depreciation.

A convenient form for presenting the results of profitability calculations is a projected profit and loss statement like Fig. 1. It portrays what all of the estimates indicate the profits will be—if and when the project is authorized. It is the same type of profit and loss statement used by accountants, except that accountants present historical facts. Engineers present the picture for the future—they forecast the profit and loss statement.

In making profitability calculations for this project, let us assume the following:

- For the Rock Products Sand and Gravel Co. an increased investment of $1 million will be required for a new plant and equipment, assuming that neither new land nor additional working capital are required.
- The markets have been properly surveyed.
- The new facilities have been laid out.
- Construction costs have been estimated.
- Cost of sales has been estimated.
- Administrative and selling expenses have been estimated.
- Assume that the profit before fixed charges has been derived from previous estimates.

The projected annual profit and loss statement

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"I like their fast dump-action"

says pit operator

Tournapull operator dumps 22-ton load of rock into grizzly fast, and without spillage, because entire dump is under power-control. At full dump position, edge of bowl is low and behind rear wheels . . . material cannot roll forward to lodge against wheels, nor pile under rear end. Operator Gene Arsenault says, "These Rear-Dumps work and get around where a truck won't. They operate easy . . . we've had no trouble with the electrical system."

Material Service's Rear-Dump is loaded with 22 tons of rock in less than 3 min. Shovel operator does not have to take it slow and easy when loading Tournapull haulers. Unit's *all-steel* body — with sloping sides, and tri-level bottom—resists shock and crushing damage of loading heavy rock. Low, wide bowl permits dipper to swing-in and out *low* . . . for faster loading and minimum spillage.

At their East Granby, Connecticut pit, Materials Service, Inc. of Windsor Locks, produces 500,000 tons of crushed hard-trap rock per year. To help maintain production, two LeTourneau-Westinghouse C Tournapull® Rear-Dumps haul 80% of the rock from pit to crusher. Here's how these electric-control pivot-steer haulers perform:

Haul 22-ton loads up 11% grade

With 8 passes, the 2½-yd. shovel fills L-W Rear-Dumps with 22 tons of rock in 2 min. 51 sec. Units haul 1550′ from pit-floor to grizzly — including 500′ of 11% grade — in 3 min. 24 sec. At plant, Tournapull haulers make a tight U-turn, back up to grizzly, and dump their load in 12 sec. Rear-Dumps then return to shovel in 3 min. 4 sec., completing steep 3100′ cycle in 9 min. 31 sec.

Pleased with the performance of their Tournapull Rear-Dumps, owner Angelo Roncari says, "These units have done all we've expected of them. Best of all, I like their fast dump-action."

Electric-controls, simplified construction

Tournapull hauler's smooth, quick dump-action, is largely due to its electrical-control system and simplified construction. When operator flips toggle-switch on dash, point-of-action electric-hoist-motor is activated instantly. Body raises quickly to desired angle. There's no delay for hydraulic pressure build-up, no shock-loads — as with gravity dumping. And with only a few places to inspect and lubricate, maintenance time on rugged Rear-Dumps is greatly reduced.

See Rear-Dumps in action

To increase your production and lower maintenance costs, investigate modern Tournapull Rear-Dumps. There are 3 sizes: 11, 22, and 35 tons. Call or write for complete details, or let us show you these speedy haulers in action.

CR-1662-QMJ-1

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A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

FIG. 2

Interest rate drop during loan period

Year	Average Interest	Average Rate Percent
1	$45,000	4.50
2	42,800	4.28
3	40,500	4.05
4	38,200	3.82
5	36,000	3.60
6	33,700	3.37
7	31,500	3.15
8	29,300	2.93
9	27,000	2.70
10	24,800	2.48

FIG. 3

Comparison of three depreciation methods

	Straight-Line		Declining-Balance		Sum-of-the-Digits	
Year	Annual Deduction	Amount Recovered	Annual Deduction	Amount Recovered	Annual Deduction	Amount Recovered
1	$10,000	$10,000	$20,000	$20,000	$16,667	$16,667
2	10,000	20,000	12,000	32,000	13,333	30,000
3	10,000	30,000	7,200	39,200	10,000	40,000
4	10,000	40,000	4,320	43,520	6,667	46,667
5	10,000	50,000	2,592	46,112	3,333	50,000

To expand or not to expand?

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for this proposed investment of $1 million in new plant and equipment is derived as shown in Fig. 1. In our example, the investment in plant and equipment was assumed at $1 million. The projected profit and loss statement reveals an annual net cash return of $333,000. By definition, the payout time is the investment divided by the annual net cash return; thus the payout time is three years. One point should be emphasized: the big role of income taxes in the profitability of a project. In Fig. 1, starting with a profit before fixed charges of $719,500, income tax charges amount to $336,000 per year and other allowable deductions amount to $50,500 per year. This leaves a net cash return of $333,000 per year.

Annual profit before income tax is $629,000. But annual net cash return is only $333,000. If the profit before income tax were used to justify the economic feasibility of a project, an erroneous and misleading answer would be obtained. Your answer would be 90 percent wrong.

Fixed charges are defined somewhat differently than usual. Because we need the information segregated, depreciation is shown in a separate category. Costs are fixed because they are tied by some relationship to the investment and are independent of volume of production or sales. Property tax, insurance on property, and interest on investment are fixed costs. Interest on investment is discussed later as a separate item, but it could just as well be included because it is part of the fixed charges. Just so that we will have an illustration, we have assumed in these calculations that the property tax and insurance will be one percent of the investment.

Interest varies according to payout time. Thus, if a loan is for 10 years, we need not consider payments for interest after the project is paid for. In this sense, we let the project stand on its own merits during the payout time. If payout time is three years, accumulated funds can be paid back or reinvested. If they are reinvested, let the other project carry the interest charges for the remaining seven years.

Fig. 2 shows how the average interest and interest rate drop as the period of a loan extends for a 4½ percent loan on $1 million for 10 years.

If financing of a project is done from retained earnings, the interest on the investment is not paid out for the new venture. Thus, interest is not an allowable item of cost before computing income tax. On the other hand, the same funds could be invested elsewhere and would realize some earned interest to the corporation. By comparison, a new venture "loses" this interest less the taxes to be paid on the "lost" interest. Therefore, profitability calculations can properly include interest either on borrowed funds or from retained earnings.

Deducting for depreciation. In making profitability calculations, the amount which you can deduct for depreciation is based on what the Internal Revenue Service allows. Usually no funds are set up for depreciation because a business cannot afford to set aside money for replacement only. If the earnings are accumulated, they are lumped with several other funds and are not isolated. The Bureau of Internal Revenue allows this deduction before paying income tax. In this way it encourages investment.

The preparation of profitability calculations is further complicated by the tax law which permits several methods of depreciation. In addition to the straight-line method, the methods include the double-declining-balance and the sum-of-the-digits methods.

The declining-balance rate is determined by first finding the straight-line rate (100 percent divided by the asset's original useful life.) Under the double-

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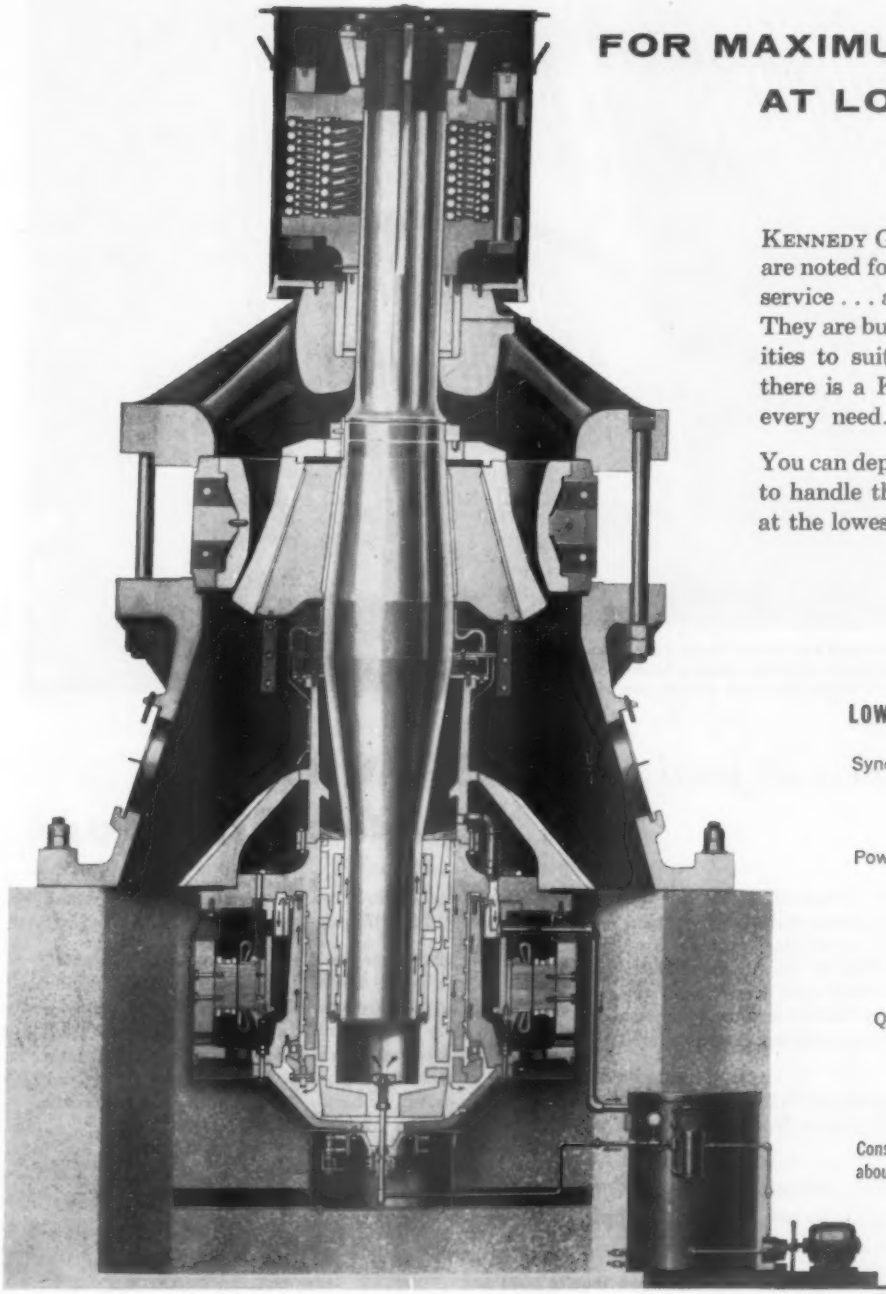
KENNEDY



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Lifesaver for new or used equipment VICTOR Hardfacing Alloys

Wasco County, Oregon, uses lots of crushed basalt. This rock crushes readily, yet is extremely hard and highly abrasive, consequently tough on rollers. So, as standard practice, Supt. Wayne Weeks hardfaces all rollers in brand new crushers, before ever they crush a single basalt rock. He reports hardfacing of new equipment prevents excessive wear of surface material, thus maintaining roller size during the work hardening period.

On this new crusher, he used 200 lbs. of Victor #0 semi-automatic wire, size 7/64", to hardface roller faces, and 50 lbs. of tube Victorite coated for finish work around the roller edges. Longer crushing life will quickly pay for the rod.

You, too, can save money and extend the life of equipment subjected to abrasion, impact and heat. Simply make it standard practice to hardface both new and worn equipment with Victor alloy rods. Complete line of 27 different hardfacing rods assures you a right rod for every hardfacing need. Full range of sizes for both acetylene and electric AC and DC applications, either hand, automatic or semi-automatic. Order a supply from your Victor dealer TODAY.

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Depletion can be calculated on cost of deposit or on extracted tonnage divided by estimated total tonnage

To expand or not to expand?

continued from page 144

declining-balance method, twice the rate determined by the straight-line method is applied to each year's remaining unrecovered cost. Thus, if the useful life of a plant or a piece of equipment is 10 years, the straight-line rate is 10 percent and the double-declining-balance rate is 20 percent. If the original cost of the property is $10,000, the depreciation the first year is $2,000 ($10,000 times 20 percent), the depreciation the second year is $1,600 (the unrecovered cost of $8,000 times 20 percent), and so on.

Under the sum-of-the-digits method, the depreciation rate is a fraction. The numerator of the fraction is the remaining useful life of the property at the beginning of the tax year. And the denominator is the sum of the years of useful life of the asset at acquisition. As an example, for an asset with a useful life of five years, the denominator of the fraction each year will be:

$$1 + 2 + 3 + 4 + 5 = 15$$

The depreciation allowable for the first year would be 5/15ths of the cost, for the second year it would be 4/15ths, and so on.

Fig. 3 compares the straight-line, double-declining-balance, and sum-of-the-digits depreciation for an asset costing $50,000 with an estimated useful life of five years. For such an asset, the straight-line method allows 20 percent of the orginal cost each year, and the declining-balance methods allows twice that rate, or 40 percent. But the declining-balance method applies the higher rate to the declining-balance—the unrecovered cost of the asset.

The sum-of-the-digits method allows 5/15ths of the original cost in the first year, 4/15ths in the second year, and so on.

Notice in Fig. 3 that both the double-declining-balance and the sum-of-the-digits depreciation methods produce larger deductions in the earlier years than the straight-line depreciation method and smaller deductions in the later years.

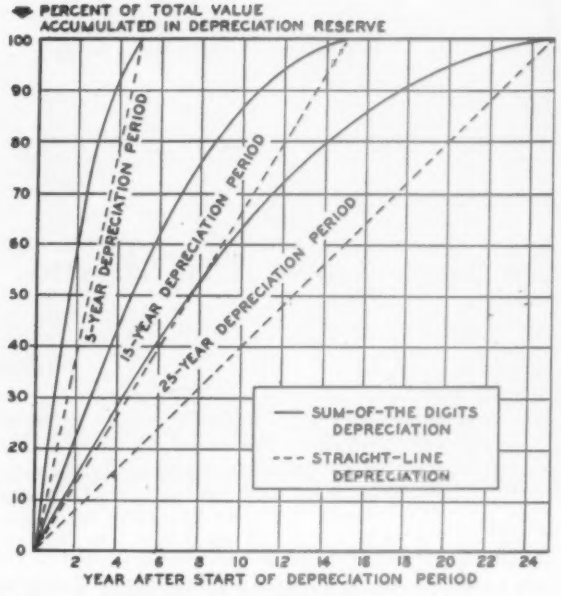

Fig. 4. Depreciation reserves accumulated vs. time

In making profitability calculations, it is convenient to show the effect of the depreciation period on the depreciation reserve by plotting the years versus the accumulated reserve. This effect is demonstrated by the graph in Fig. 4 for various permissible depreciation periods.

For simplicity, it utilizes the sum-of-the-digits method of depreciation. It also shows the straight-line method for comparison purposes. This type of graph can assist you in preparing profitability calculations because you can quickly pick off the reserve for depreciation accumulated for any given payout period.

In using either method, it's necessary to calcu-

Please turn to following page

FIG. 5

Calculating depreciation by sum-of-the-digits method (using example shown in Fig. 1)

	For 3 Years	Average Per Year
Profit before depreciation (from example in Fig. 1)	$2,007,000	$669,000
Depreciation	220,000	73,000
Subtotal	$1,787,000	$596,000
State tax at 3%	54,000	18,000
Subtotal	$1,733,000	$578,000
Federal tax at 52%	901,000	300,000
Net profit	$ 832,000	$278,000
Add back depreciation	220,000	73,000
Cash return	$1,052,000	$351,000

$$\text{Payout time} = \frac{\$1{,}000{,}000}{351{,}000} = 2.85 \text{ years.}$$

To expand or not to expand?

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late profitability by trial and error. You must fit the depreciation to be included to the payout time yet to be calculated because the accumulated depreciation will vary by years by either method of depreciation.

Using the same example as shown in Fig. 1 for an asset worth $1 million having a useful life of 25 years but depreciated by the sum-of-the-digits method, the payout time would be 2.85 years rather than the three years shown for the straight-line method. For convenience, the calculation has been made assuming a three-year payout as was derived from the straight-line method, but the actual depreciation permits a payout in 2.85 years. This is shown in Fig. 5.

The accumulated depreciation in three years will be $220,000 for the sum-of-the-digits method compared to $120,000 for the straight-line method. The depreciation has been found from Fig. 4 to be 22 percent at the end of three years. The cash return using the sum-of-the-digits method will be $18,000 per year more.

Depletion in the minerals industry is permitted by the Internal Revenue Service for those assets owned by the company which will be used up by the operations. This applies to the sand and gravel business, and to cement and stone firms operating quarries. Sometimes this is calculated as a percentage of the cost of the deposit; sometimes on the basis of the tonnage extracted divided by the total tonnage estimated.

Net profit is the amount of earnings reported to stockholders of corporations, and the amount from which dividends are paid. In the final analysis, this is what interests the stockholder.

We do not suggest substituting net cash return for payment of dividends but do suggest that it be recognized that the cash is available for: reinvestment, replacement of plant and equipment or more rapid repayment of a long-term loan.

Investment properly includes the cost of land, the cost of the plant and equipment, the interest during construction (unless accounted for elsewhere), and the working capital. We have omitted them here in order not to complicate the calculations. In actual case studies the cost of land and the allowance for working capital shouldn't be ignored. Working capital cannot be depreciated, nor can land.

Working capital is the amount of money required to continuously operate a business. It consists of funds which will be risked in the new venture and which would be lost if the business fails. Your payout calculations must cover this amount as well as the investment in land, plant, and equipment.

In preparing estimated-investment requirements, you should make due allowance for contingency—this allowance usually is carried in the estimated cost of the capital investment for plant and equipment. Note that in profitability calculations we have not provided a contingency factor other than in this capital amount.

In the mineral industries, working capital may be a substantial part of the entire investment, especially for those industries which are required to work the year around but whose sales do not keep up in the winter. The winter months would be spent in stockpiling production, and this will require higher working capital. While the example does not include working capital in the payout, in actual practice it must be included.

Allowance for risk. These calculations purposely have not included an allowance for risk for any proposed new project. This must be left to the judgment of the individual investor because it is his risk. Our calculations summarize all known conditions and are based on some added assumptions. The risk entailed is in the accuracy of the calculations, the reasonableness of the assumptions, and in unforeseen factors, i.e., technology changes outmoding your product.

Please turn to page 174

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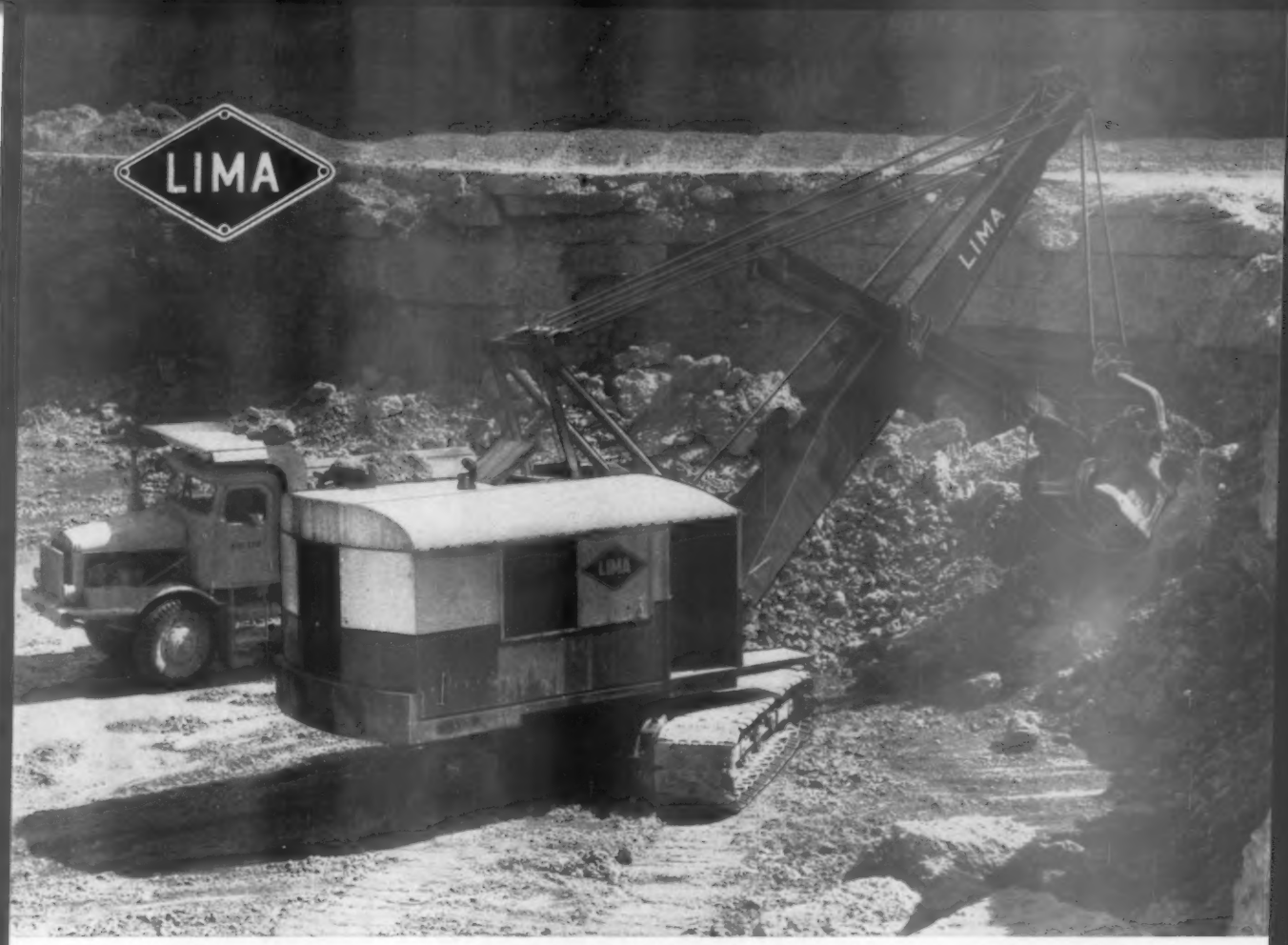

LIMA Type 803 Shovel, equipped with 30-ft. boom and 2½-cu. yd. bucket, loading truck at J & K Stone Co., Inc., quarry, Muncie, Ind.

J & K Stone Co., Inc., finds LIMA dependability a big factor in maintaining production

J & K Stone Co., Inc., Muncie, Ind., is a leading supplier of specification materials to all types of road-building contractors in that area. Main plant capacity is now approximately 1800 tons per day with a second plant producing about 1000 tons per day. It is expected that this plant will soon exceed the capacity of the main plant. Two rugged LIMAS handle the digging and loading jobs.

James McDonald, plant superintendent, says: "We had a LIMA 802 for nine years that gave us excellent service—very little maintenance, trouble or downtime. When work required another shovel the satisfactory performance of our first LIMA prompted us to buy another LIMA. The older machine was retained for our secondary operation.

"In my opinion, LIMAS are quality machines, built for long profitable operation with many plus features which have added to the continued operation of one plant.

"Another big factor that has sold me on LIMA is their exceptional factory service. This is extremely important, because our capacity is in direct ratio to the capacity of our LIMAS."

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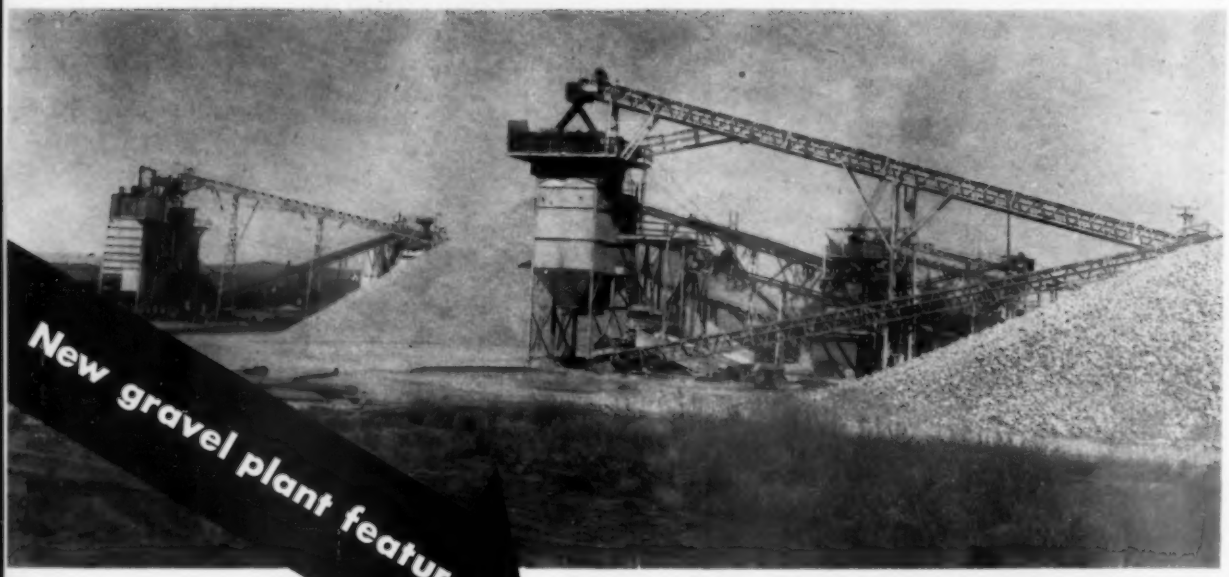

New gravel plant features

Overall view of the plant. Load out bins are at left. Secondary crusher is in tower at center and cobble pile is at right

High specification output with fewer man hours

PRODUCING AGGREGATE for your own ready-mix operations that will also meet the specifications of other customers is not an easy trick, but the Union Sand & Gravel Co. has mastered it. The company's sleek, modern Yardley plant in Spokane, Wash., produces washed sand and gravel and crushed gravel in considerable variety at the rate of 250 tph., with high production per man-hour.

An especially good example of this is the sand and gravel processing section, a major portion of the plant, which runs efficiently without a single man in the section acting as operator. Instead, the man who operates the load-out equipment, seated high in the truck and rail car delivery section, also watches the gravel processing plant and controls it with two pushbutton panels. If any trouble should develop, he can signal the repair department to take over.

In the sand processing section two grades of sand are prepared—a coarse sand and a blended sand. The deposit is deficient in fines; but the deficiency is made up by bleeding a fine sand into production early in the system. Fine sand is trucked to the Yardley site and dumped into a truck hopper with a reclaiming belt. When blended sand is prepared, the fines add approximately 40 percent to the total sand produced. A 5 ft. long hopper over the reclaim belt is 8 in. wide at the bottom and open for its entire length, for the sand is fine and often damp. A control slide gate is at the hopper's outer end. By having this type of gate a steady and uniform feed to the reclaim belt is obtained without arching of the sand over the belt.

For the company's several ready-mix plants in and around Spokane, a coarse sand is prepared and ground stored. No fine sand is added to this material as there are bins and adequate weigh-batching facilities at the plants to add the necessary fines to the coarse concrete sand.

All sand is a minus 3/16-in. product. Pulp from the sand screen flows to a 20 ft. long six-spigot water scalper. Dewatering is done in a 48-in. sand preparation spiral. Two belts in series carry the sand to individual ground storage areas. The first section of the belt serves the coarse sand pile and when the blended sand is prepared, the first belt delivers to the second belt.

Please turn to page 152

Never before has Chevy been so right for strip mining and quarry work!

Here's a truck specially designed to take to your kind of work like a duck takes to water! It's Chevrolet for '58 with new hustle, muscle and style that mean money in your pocket!

As you can see, Chevy's a honey of a truck this year, and that handsome, broad-shouldered '58 appearance only hints at the host of new and improved features that are ready to put you dollars ahead in the years to come. *Here's a truck ideally suited for haulers in your line of work.* Here's new styling to help build your business prestige every day in the week. And what workers these new heavyweights are! There's new power to whip mammoth hauls from the industry's newest engine, the 230-h.p. Workmaster V8* with revolutionary Wedge-Head design . . . or from the durable 175-h.p. heavy-duty Super Taskmaster V8 in Series 70 and 80 models. G.V.W.'s go all the way up to 36,000 lbs. (with Triple-Torque tandem) for big, profitable payloads. And these trucks come equipped with the toughest of big truck chassis components, either as standard equipment or as extra-cost options: cast spoke or disc wheels, air-hydraulic brakes, full-air brakes or big Hydrovac power brakes, and smooth Synchro-Mesh transmissions built to meet your needs precisely.

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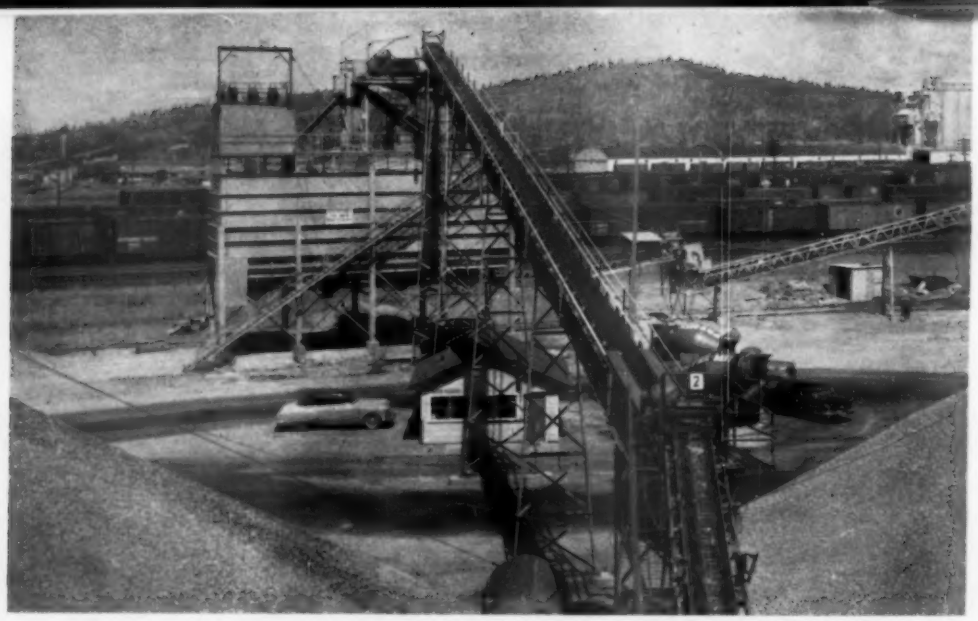

Load out bins for cars and /or trucks. Much of the plant control equipment is on top of this structure along with a three-deck rinse screen

High output

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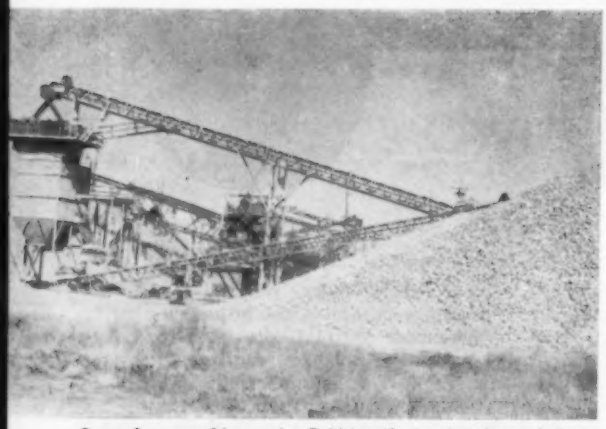


Secondary crushing unit. Cobble pile is at right and the two belts in the foreground return crushed gravel to the screens over the bins

Primary excavation in the pit is by three 4-cu. yd. crescent scrapers equipped with teeth. The usage is so severe that teeth must be built up with hard-surfacing alloy every 10 days. The crescent digs under water up to 75 ft. deep, and handles boulders in excess of 20 in. diam. Digging is at the rate of 200 tph. To take care of the plant, which is rated at 250 tph., the pit operates on a 12-hour schedule while the plant operates 8 hours. Any plus 16-in. material excavated is by-passed over a grizzly inclined at right angles to the direction of travel of the crescent scraper. The plus boulders slide down the grizzly and are pulled aside by a small scraper.

The minus 16-in. is fed to a second 4-in. grizzly by a vibrating feeder, with the plus falling to an 18 x 36-in. jaw crusher set to 4 in. Material which has gone through the crusher and grizzly is then conveyed to an elevated 4 x 10-ft. dry screen located in a worked-out section of the pit. This single-decked screen takes out a minus 2-in. gravel-sand product which drops to a surge pile under the screen. The plus 2-in. material goes to a second surge pile, or cobble pile. Cobbles represent about 30 percent of the total material.

The secondary crushing system for the cobbles, an unusual feature of the plant, operates as a separate unit. Any blending of the crushed rock from this plant is done at the batching plants. Under the cobble pile is a reclaim tunnel with a heavy-duty electrically vibrated feeder, that delivers to a belt conveyor. Near the portal of the tunnel a tramp metal detector has been installed instead of an ordinary magnet because manganese steel parts are used as a part of the digging equipment. This detector stops the belt when any metal passes through the system.

The slightly inclined belt delivers direct to a 3-ft. standard cone crusher. From there, material goes to an off-bearing belt system and the crushed rock is elevated to the top of the section where two 4 x 12-ft. vibrating screens receive a split feed. Both screens are double-decked and operate dry.

Screened material falls to the steel bins and any oversize or plus rock can be chuted to one of two

36-in. short heads that are installed in a straight line alongside the standard cone. Crushed stone from the two short heads is recirculated to the screens. Normally 1¼-in., ¾-in. and ⅝-in. crushed gravel is prepared. The steel bins can be used to load out trucks and are equipped with high and low level bin indicators.

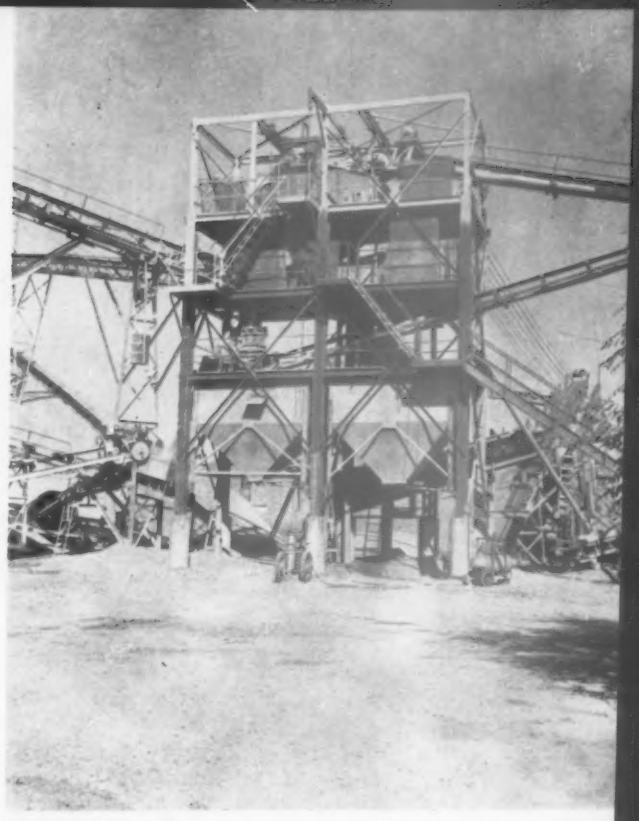
The minus 2-in. from the pit screen is withdrawn from its surge pile to a reclaim belt by an electrically vibrated feeder with a reciprocating plate feeder as a spare. To this belt system the fine blending sand can be added when desired. After the addition of the fine sand to the belt, material is weighed on a continuous weighing unit so that an accurate tonnage figure is available for aggregate going to the washing section.

The first screen in the washing plant is a three-decked 5 x 12-ft. low-head which operates wet. Plus 1½ in. from the top deck of the screen falls to an 18-in. gyratory crusher that is mounted on the second floor of the screening tower. It is set to deliver a ⅝ x ¾-in. product and handles 25 tph. with ease. Its wear characteristics are excellent. Crushed gravel from the gyratory is recirculated.

The second screen is a 5 x 12-ft., two-decked unit which operates wet. The screens prepare two main products, 1½ x ¾-in. and a ¾ x ¼-in. These are ground stored over reclaim tunnels by stacker belts. The two reclaim belts from each pile deliver to a common off-bearing belt serving the load-out section and if desired some blending of these two products can be made on the off-bearing belt. In addition to the two larger sizes prepared, the wet screens prepare smaller sizes of gravel that can be binned or ground stored. Stockpiles are inventoried monthly.

The main load-out bin is built alongside the railroad track with its long axis parallel to the rails. A screen on top of the bins delivers to the four compartments. A belt conveyor operates under this series of bins and material can be sent to a short car-loading belt that operates at right angles to the main belt, or the aggregates can continue on to the concrete batching plant. Over the first section of the load-out belt is a second continuous weight recorder. Materials not served by reclaim tunnels are reclaimed by front-end loaders. A three-deck rinse screen is over the load-out bins.

All conveyor belts are 24 in. wide. Chutes are made of ½-in. two-ply rubber. The rubber is folded into a U shape to form the chute with angle irons at the sides for support. Belts are kept clean by a strip of 1 in. thick gum rubber that acts as a scraper. This has proven more satisfactory than any other material.



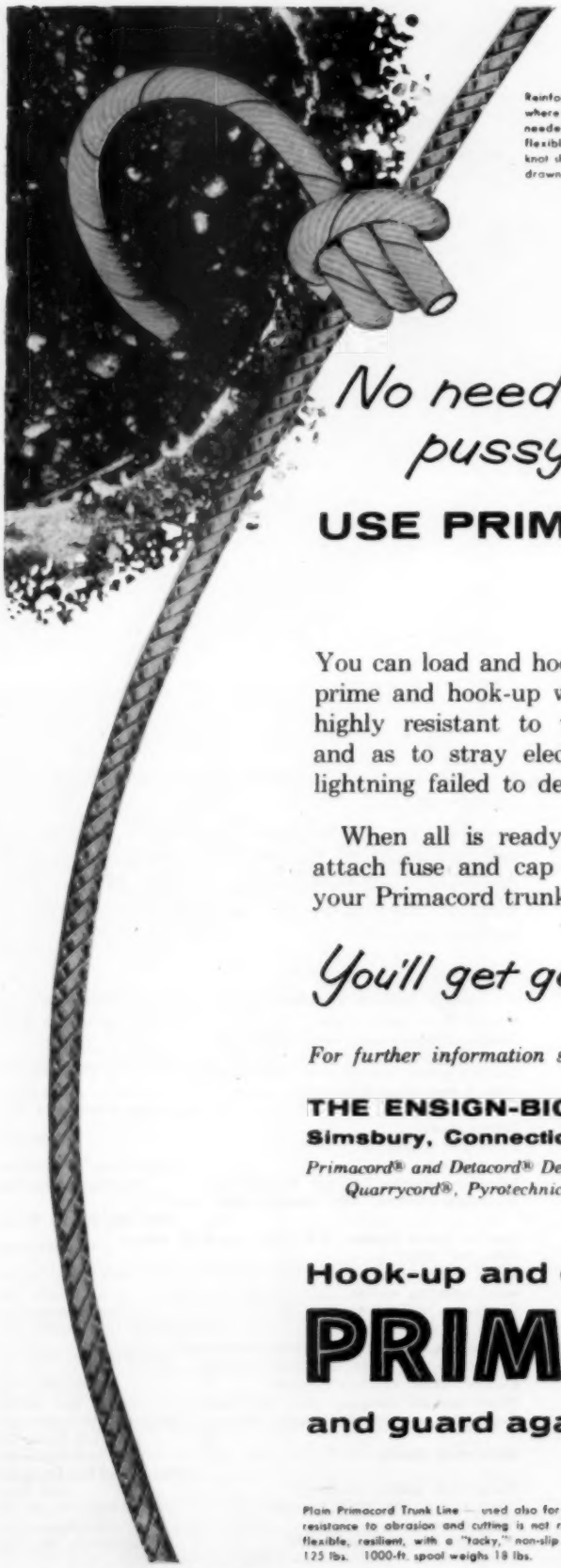
Wet screening section for sand and gravel. An 18-in. gyratory crusher is on the second floor

This operation is owned by John W. Murphy, a past president of the National Sand and Gravel Association, in partnership with W. M. Murphy. Wm. E. Kellogg is vice president in charge of operations.

MAJOR EQUIPMENT USED AT UNION SAND & GRAVEL CO.

Scraper, 4 cu. yd. Crescent	Sauerman Bros.
Crusher, primary, Cedarapid, 1836	Iowa Mfg. Co.
Scalper screen, 4 x 10 ft.	Iowa Mfg. Co.
Crushed gravel screens, 4 x 12-ft. two-deck	Iowa Mfg. Co.
Rinse screen, three-decked, 4 x 12 ft.	Iowa Mfg. Co.
Primary feeder	The Jeffrey Mfg. Co.
Cobble feeder	Syntron Co.
Surge pile feeder	Syntron Co.
Metal detector	Radio Corp. of America
Secondary crusher, 3-ft. std. Symons cone	Nordberg Mfg. Co.
Secondary crushers, 3-ft. Telsmith short head (2)	Smith Engineering Works
Crushed gravel screens, 4 x 12-ft. two-deck, Vibrex	Hewitt-Robins
Belts and idlers	Hewitt-Robins
Speed reducers	Falk Corporation
Hard surfacing metal	Stoody Co.
Continuous weight recorder, (2)	Fairbanks-Morse Co.
Surge pile plate feeder	Diamond Iron Works, Inc.
Wet screen, 5 x 12-ft. low-head, three-deck	Allis-Chalmers Mfg. Co.
Wet screen, 5 x 12-ft. low-head, two deck	Allis-Chalmers Mfg. Co.
Crusher, 18-in. Kue-Ken gyratory	Straub Mfg. Co.
Water scalper, six-spigot sand classifier	Eagle Iron Works
Sand prep. machine (dewaterer) 48-in.	Western Machinery Co.
Mixer truck chassis	The White Motor Co. / Ford Motor Co. / International Harvester Co.
Mixer truck bodies, Challenge	Cook Bros.
Truck scales with Weightograph	Howe Scale Co.
Bin-dicators	Bin-Dicator Co.
Front end loader, Scoopmobile	Mixermobile Mfg. Co.

END



Reinforced Primacord Branch Line — recommended for deep holes where normal strength and resistance to abrasion and cutting are needed. Textile reinforced (yellow with red thread), tough, resilient, flexible. Tensile strength 160 lbs. 1000-ft spool weighs 19 lbs. The knot shown is the double-wrap half hitch, made in the branch line and drawn tightly around the trunk line.

No need to pussyfoot...

USE PRIMACORD

You can load and hook-up *well ahead* of the blast when you prime and hook-up with Primacord detonating fuse. It is highly resistant to vibration, friction, impact, sparks — and as to stray electrical currents, even a direct hit by lightning failed to detonate Primacord.

When all is ready for the blast — then and then only attach fuse and cap or electric blasting cap to the end of your Primacord trunk line.

You'll get good digging

For further information see your explosives supplier or write to

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Simsbury, Connecticut • Since 1836

Primacord® and Detacord® Detonating Fuse, Safety Fuse, Ignitacord®, Quarrycord®, Pyrotechnical Devices and Blasting Accessories

Hook-up and detonate with

PRIMACORD®

and guard against *Stray Current* hazards

Plain Primacord Trunk Line — used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a "tacky," non-slip surface. Tensile strength 125 lbs. 1000-ft. spool weighs 18 lbs.

P-c

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AIR BLENDING—Fuller Co. has prepared Bulletin B-1 describing its Airmerge System, a means of blending pulverized materials in a silo through quadrant aeration. Principles of Airmerge blending are discussed, and a typical installation is illustrated.

Enter 500 on Reader Card

BELT CONVEYORS—Carpco Mfg., Inc. is distributing Bulletin BCB-101 containing design features, specifications and operating details of its Models BC68 and BC1214 sliding type belt conveyors. Capacities of 50, 100 and 150 lb. per cu. ft. materials handled by the conveyors are given.

Enter 501 on Reader Card

CENTRIFUGAL PUMPS—Ingersoll-Rand Co. has released Form 7148-A describing its Models RT, RTS and RTL centrifugal pumps designed for continuous heavy-duty operation within the medium pressure range. Included are cross-section views and table of dimensions.

Enter 502 on Reader Card

CRANES—The Thew Shovel Co. has brought out a catalog covering its Model MC-530 35-ton Moto-Crane. Crane features and optional equipment are described as well as a rubber-tire carrier designed for the MC-530.

Enter 503 on Reader Card

CRAWLER TRACTOR—International Harvester Co. has brought out 20-page Catalog CR-634-G, describing its TD-24 torque converter or gear drive crawler tractor. Illustrations and a schematic drawing point out tractor features.

Enter 504 on Reader Card

DISC CLUTCHES—Stearns Electric Corp. has made available Bulletin 501 describing its 4200 Series electro-magnetic disc clutches for use on ball mills, rod mills, compeb mills and kilns.

Enter 505 on Reader Card

ENGINEERING SERVICES—McNally Pittsburg Mfg. Corp. has published Bulletin 757, describing its personnel capabilities, physical facilities and products, and explaining design and engineering services offered. All phases of production at its Pittsburg, Kan., and Wellston, Ohio, plants are covered.

Enter 506 on Reader Card

ENGINE METER—John W. Hobbs Corp. has prepared 12-page Catalog 600 describing its engine hour meter. Installation methods and functions of both direct and alternating current meters are explained.

Enter 507 on Reader Card

EXCAVATOR—Koehring Division has released a bulletin covering its crawler mounted 805 Excavator. In addition to showing job applications, photos illustrate carbody, upper machinery, lower crawler frames and lower crawler assemblies.

Enter 508 on Reader Card

FLUE GAS ANALYZER—Leeds & Northrup Co. has prepared Application Data Sheet 463-60 describing its magnetic O_2 system for flue gas analysis. Because excess air O_2 is measured directly and sample averaging is representative of actual combustion, this system provides an index of combustion conditions even with multifuel firing.

Enter 509 on Reader Card

FORK TRUCKS — Elwell-Parker Electric Co. has issued a brochure describing its Elpar Model F-26T2 electric powered fork truck. Engineering drawings and application photographs are included.

Enter 510 on Reader Card

GAS WELDING—Modern Engineering Co. has brought out 36-page 1958 welding equipment Catalog 160 covering recommended applications of its line of oxy-acetylene welding and cutting torches, air-acetylene torches, machine cutting torches, welding regulators, industrial regulators, pressure gauges, tank couplings, adaptors, hose connections and safety instruction manual.

Enter 511 on Reader Card

GRAVEL BENEFICIATION—Blaw-Knox Co. has issued Bulletin 2620 describing its gravel beneficiation process for upgrading aggregates. The elastic fractionation theory and process is discussed.

Enter 512 on Reader Card

INDUSTRIAL HEATER — American Air Filter Co., Inc. has published 26-page Bulletin 750A describing the construction, application and performance features of its Herman Nelson industrial heater. A discussion of the selection and application of steam coils, hot water coils, unit size selection, useful definitions and formulas for use in computing selections, and suggested materials of construction are included.

Enter 513 on Reader Card

LUBRICANTS—The Whitmore Mfg. Co. has brought out a folder describing its various types of lubricants. A reference to serve in determining the correct lubricant to use for specific equipment applications and for varying seasonal temperatures is included.

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RP-2-58

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FEBRUARY, 1958
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TO HELP YOU OVERCOME TODAY'S PROBLEMS... AND TO PLAN EFFICIENTLY FOR TOMORROW

FREE INFORMATION

You can obtain catalogs and literature listed on these and other pages of the magazine by entering the number appearing either below or beside the item of interest on the READER-SERVICE CARD in this page.

MACHINERY MAINTENANCE—International Research and Development Corp. has made available a bulletin describing its complete line of systems to reduce costs of machinery maintenance and quality control. Application possibilities and operating ranges are given for vibration analyzers, filters and classifiers, and various models of balancing machines.

Enter 515 on Reader Card

MATERIALS TESTING—Kennedy-Van Saun Manufacturing & Engineering Corp. has issued Bulletin D-1005 containing a description of the operations involved in some of the tests performed at its test and research center. Materials tested include: agricultural lime; dolomite; gypsum; limestone; pozzolan and silica sand.

Enter 516 on Reader Card

MILL REGULATOR — Reliance Electric and Engineering Co. has made available Bulletin K-2503 describing its dual-circuit VSMR mill regulator. Photos and drawings are included to explain mill operation.

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MOTORS—U. S. Electrical Motors Inc. has released Bulletin F-1929 describing its Models J & E totally enclosed and explosion-proof motors and Bulletin F-1797 covering its Varidrive motor with speed control handle.

Enter 518 on Reader Card

NATURAL RESOURCES — Arc Laboratories, Division of Arizona Research Consultants, Inc. has published "Arizona's Natural Resources," a bulletin providing a summary of natural resources found in Arizona from asbestos to zinc. The uses, markets and prices and occurrences of 41 metallic and nonmetallic minerals are discussed.

Enter 519 on Reader Card

RECORDERS — Royson Engineering Co. has released a folder illustrating and describing its Identicharts which are capable of recording, on a strip chart, conditions occuring at a remote point. Four models and accessory equipment are covered.

Enter 520 on Reader Card

RECUPERATOR—Manitowoc Shipbuilding, Inc. has prepared a booklet describing the operation and design of its recuperator for rotary kilns. Included are an air flow diagram and discussions of air quenching, preheat, heat recovery, quality and grindability.

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ROCK RIPPERS—Caterpillar Tractor Co. is distributing Form D757 describing four of its sizes of tractor-mounted rock rippers. A variety of uses for rippers also are discussed.

Enter 522 on Reader Card

SAND, SLURRY PUMP—Krogh Pump & Equipment Co., Inc. has made available Bulletin 601 describing its Model 600 sand and slurry pump. Specifications are given along with a complete parts list, cross-sectional view showing construction details and a capacity chart which gives performance characteristics for an average sand slurry.

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SPROCKETS—Farrell-Cheek Steel Co. has prepared Catalog 21 containing specifications and engineering data on its cast tooth steel sprocket for cast combination and steel roller chains. Illustrations of tooth forms, hub and sprocket types as well as ordering instructions are given.

Enter 524 on Reader Card

STACKER—Stephens-Adamson Mfg. Co. has prepared Bulletin 655 explaining the operation and materials handling ability of its Swivelpiler. The use of the unit as an aid in eliminating double handling of materials is discussed.

Enter 525 on Reader Card

STORAGE TANK—Butler Mfg. Co. has issued Forms 1612 and 1613 covering its bulk storage tanks in sizes from 2.1 to 34.8 ton capacities. Automatic unloading and handling equipment for use with them is described.

Enter 526 on Reader Card

WELDING SUPPLIES—Air Reduction Sales Co., Div. of Air Reduction Co., Inc., has published 48-page catalog ADC 848B on supplies and accessories for gas and arc welding. Information is presented on ferrous and nonferrous welding rods for oxyacetylene welding and Heliwelding; welding and brazing fluxes and their applications; aluminum welding fluxes; brazing alloys and protective equipment.

Enter 527 on Reader Card

VIBRATING SCREENS—Deister Machine Co. is distributing 16-page Bulletin 57 describing its four basic types of vibrating screens designed to size crushed stone, sand and gravel, slag, aggregate and all types of similarly screenable materials.

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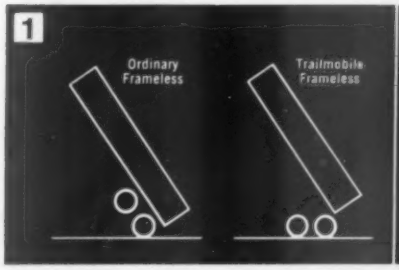
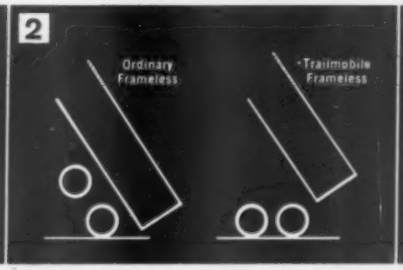
NEW TRAILMOBILE FRAMELESS DUMP TRAILER

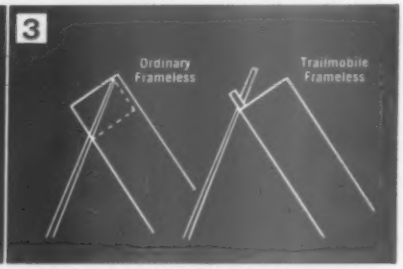
allows up to 3000 lbs. extra payload · offers five unbeatable features



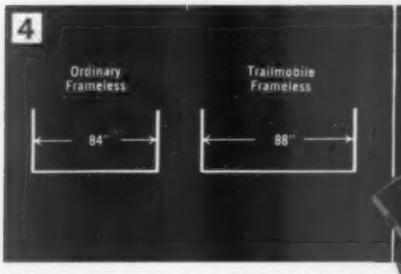
More stability—*Both axles, all 8 wheels, stay on the ground* throughout dumping cycle, whether spreading or stockpiling.



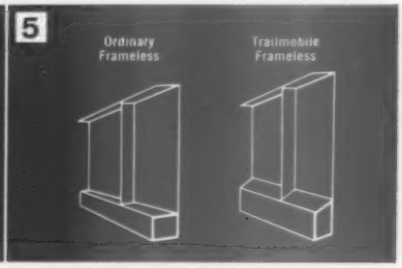
Better stockpiling—Spill point *remains 43¼" high* while piling—almost double that of ordinary frameless dumps.



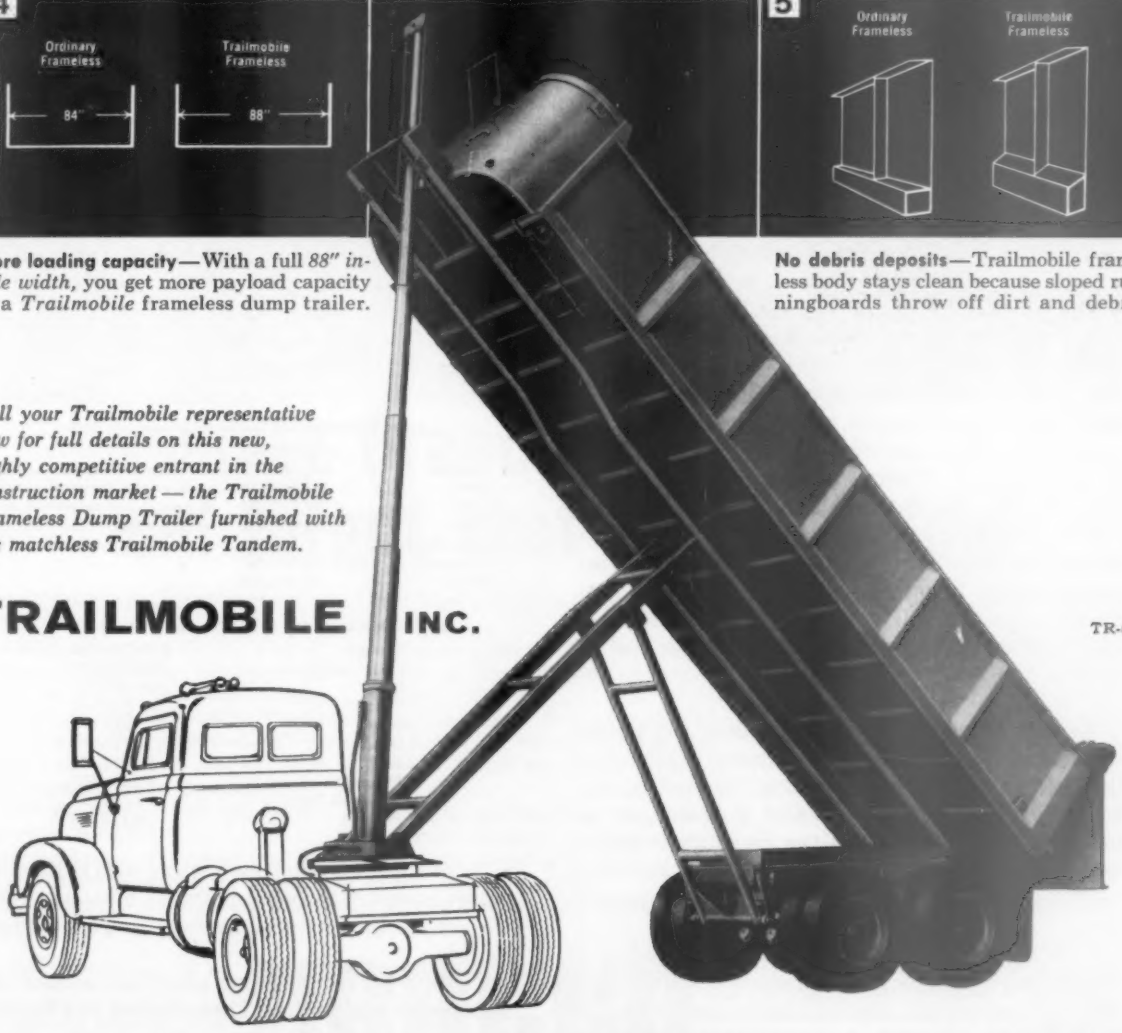
Extra cube—Newly patented *bail* eliminates space consuming doghouse . . . lowers lift point for added stability.



More loading capacity—With a full *88" inside width*, you get more payload capacity in a *Trailmobile* frameless dump trailer.



No debris deposits—Trailmobile frameless body stays clean because sloped runningboards throw off dirt and debris.



Call your Trailmobile representative now for full details on this new, highly competitive entrant in the construction market — the Trailmobile Frameless Dump Trailer furnished with the matchless Trailmobile Tandem.

TRAILMOBILE INC.

TR-668

CINCINNATI 9, OHIO • LONGVIEW, TEXAS • SPRINGFIELD, MISSOURI • BERKELEY 10, CALIFORNIA

Enter 1111 on Reader Card

"The building industry has been and will continue to be the largest volume user of industrial minerals."

Raw material

continued from page 105

Then the chemical industry—a mere babe in 1914—now is a giant. We cannot take all of the credit—for prior to 1900 Herman Frasch had started producing sulfur by steaming a cap rock over a salt dome in Louisiana, and the Solvay process for making soda ash was well established, since we did use soap in those days, and we had electrolytic chlorine plants—but these were all "heavy chemicals." Most of our organic and fine chemicals came from Germany, as did our potash. Our nitrate came exclusively from Chile, although synthetic nitrogen was known in Europe, but not commercially here. Except for some phosphate produced in Florida and Tennessee and used almost entirely on the cotton fields, our fertilizer was strictly of the barnyard variety.

The importance of the growth of the chemical industry from small beginnings into the mammoth size it has attained today has been a major factor in the expansion of the industrial mineral field, not so much in size, as in diversity. We can start down the alphabet with argon, boron, bromine, fluorspar, lithium, magnesium salts, nitrogen, oxygen, phosphate and potash, through rare earths, silicon, talc and titanium and end up with zircon and zirconium. All of these things that are commonplace in our discussions of mineral production owe much, if not all, of their existence as commercial products to the fabulous chemical industry.

Another giant of our time has been the electrical industry, and although its influence on the mining field has been greater among the metals, particularly copper, aluminum and tungsten, it has been a great stimulant to the ceramics industry, which in turn is a big user of industrial minerals, particularly of its clay products, and of its specialties.

I think that we who have been privileged to live through this period of tremendous growth of the economy of the United States, and its establishment as the greatest industrial nation in the world, have to pinch ourselves to appreciate that it is only 43 years since that August day in 1914 when the First World War started. It is a long time in our lives, but really a very short time in the life of a nation. Will the next 43 years bring a comparable or a greater growth? If it does, and I think it will, we just cannot plan our expansion fast enough. Instead of worrying about excess production and excess capacity in a few lines, we should ask ourselves, where is all of this raw material coming from?

In 1953, the latest year for which the U. S. Bureau of Mines has assembled complete statistics, the value of the metallic ores produced in the United States was $1,796,000,000, whereas the value of the nonmetals was $2,337,000,000.

The largest segments of the metal and nonmetal industries, expressed as dollar value of the raw material produced, are as follows.

Largest segments of the metal industry in 1953:

Iron ore	$790,491,229	
Copper	531,781,152	as recoverable content of ores
Zinc	125,320,890	as recoverable content of ores
Lead	89,770,370	as recoverable content of ores
Gold	59,657,850	as recoverable content of ores
Molybdenum	52,361,501	as recoverable content of ores
Tungsten	35,932,751	
Silver	33,971,479	

Largest segments of the industrial mineral field in 1953:

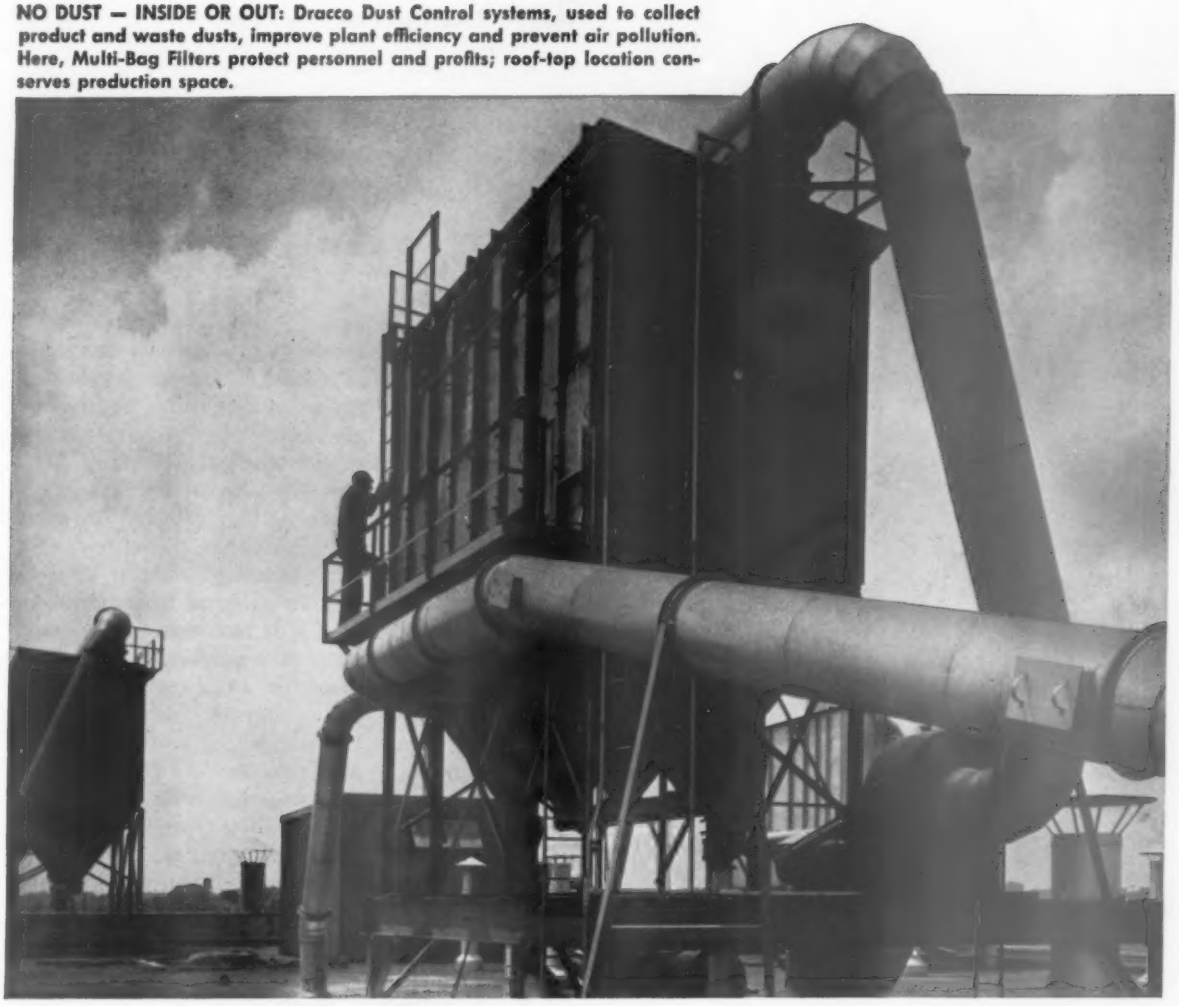
Cement	$698,268,154
Sand and Gravel	368,935,099
Stone	474,082,522
Sulfur	141,823,140
Clay	125,033,896
Lime	111,777,018
Salt	78,129,675
Phosphate	76,631,755
Potassium Salts	59,620,083
Bromine	35,372,386

Admitting we might be getting into a discussion where comparisons are odious, we must admit that we are dealing with some very large production figures.

While we are comparing statistics, some import figures are interesting. These figures are for 1953.

Please turn to page 160

NO DUST — INSIDE OR OUT: Dracco Dust Control systems, used to collect product and waste dusts, improve plant efficiency and prevent air pollution. Here, Multi-Bag Filters protect personnel and profits; roof-top location conserves production space.



specify Dracco . . . and forget that dust problem

Dust will cease to be a problem, inside or outside your plant, with Dracco Dust Control Equipment on the job. First of all, Dracco Filters trap the dust at its source before it can become a problem. Then, they collect it efficiently and exhaust only clean air with no visible dust. Finally, they keep doing this year after year with only routine preventive maintenance.

This dependability is built into Dracco equipment through—

simplified design—minimum moving parts, standard components, all parts readily accessible and easy-to-change filter bags assure lowest maintenance cost.

custom engineering—each Dracco system is fitted to exact job requirements for maximum efficiency.

proved techniques—Dracco cloth filtration techniques, perfected over the last 40 years, assure the highest collection efficiencies.

accurate fabrication—heavy-gauge metal and quality materials are skillfully converted into rugged units which provide an extra-long service life.

Solving dust and fume problems is a Dracco specialty . . . and has been for over 40 years. This experience can be combined with that of your plant engineering staff to give you better working conditions . . . improved manpower efficiency . . . lower plant cleaning costs . . . reduced machine wear . . . elimination of air pollution. If dust is your problem, you can unload your worries by contacting Dracco today.

DRACCO CORPORATION
4060 East 116th Street • Cleveland 5, Ohio

Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

DRACCO *airstream* conveyors
dust control equipment

A SUBSIDIARY OF FULLER COMPANY GENERAL AMERICAN TRANSPORTATION

Enter 1053 on Reader Card

Plibrico Refractories

THE "pro" OF proper PRODUCTS

There's nothing amateurish about the way Plibrico refractories get the job done. That's because there are no cure-all refractories in the Plibrico line, but rather specific types and grades tailored to calcining, drying and processing furnaces.

Here, in brief, are a few for your work.

Plibrico Super Air-Bond—an air setting plastic for severe combustion conditions; develops high strength through entire thickness.

Plicast K-L Mix—a dense castable with exceptionally high strength, uniform at all temperatures; highly abrasion resistant.

Plicast 15-R—Similar to the above but for use under more moderate temperature conditions.

Ask your Plibrico man for complete details. Write, too, for our catalog covering your applications.

Plibrico REFRACTORIES ENGINEERING CONSTRUCTION

PLIBRICO COMPANY • CHICAGO 14, ILL.
Plibrico Sales & Service in Principal Cities

Enter 1006 on Reader Card

Raw material

continued from page 158

In that year we imported nearly three times as much in value of metallic ores as we did of the nonmetals, $660,244,000 against $244,020,000. Among the metals, iron ore was of course the largest, but the value of manganese, tungsten, tin, copper and chromium ores and metal each exceeded $50 million.

Among the nonmetals, the leader was diamonds with a value of $105 million, followed by asbestos with $60 million. Graphite and mica were imported almost to the exclusion of a domestic industry, although the development of synthetic mica may free us from dependence on abroad, as the growth of synthetic quartz crystals has relieved the electrical industry from its tie to the difficult market in Brazil. Whether the recent production of synthetic diamonds will free us from dependence on the diamond syndicate, it is too early to say.

Cement and fluorspar, like copper, lead and zinc, feel the heavy hand of foreign competition.

Fluorspar used to be a flux in steel metallurgy, and it still is, but the whole fluo-carbon industry is on the move. It was only in 1945 that the first "bug bomb" or aerosol dispenser of an insecticide was first used. Now everything from hair lacquer, shaving cream and cake frosting is dispensed in the familiar spray bomb—yes, even car wax and deodorants. At the same time, the growth of aluminum continues to require larger and larger quantities of acid grade fluorspar.

The growth of the fertilizer industry is, I believe, one of the most specific yardsticks measuring the growth of the economy of the country, and of the living standards of its people. In plant food consumption, taking the period 1935-1939 as an average, nitrogen has grown in 20 years 521 percent, phosphoric acid 312.5 percent, and potash 500 percent. I am told by my agricultural chemical friends that if there were a market for more farm products, at existing prices, double the amount of fertilizer could be applied to the soil, and be paid for because of the increased farm production. That is a comforting thought to the producers of fertilizer materials—but it is even more comforting to those who wonder whether our fast-growing population is going to eat as well in 1990 as it did in 1957.

Let me close with an expression of confidence to our chemists, metallurgists, and business planners. You name the mineral raw material you need, and its specifications. The industrial mineral producers can supply most of your requirements right here in the United States.

END

SIX OF THESE JAEGER 600'S POWERED THE EXCAVATION DRILLING FOR NEW TIME & LIFE BUILDING, NEW YORK CITY

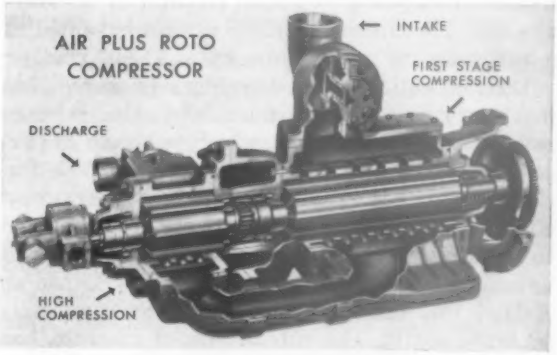
Jaeger gives you a lower, known cost for air

"MAKES" 600 CU. FT. OF AIR IN 1650 REVOLUTIONS ON 1.2 LBS. OF FUEL

Using the same GM 6-71 diesel engine, a Jaeger "600" delivers the same air volume at 1650 rpm that all other rotaries need 1800 rpm to produce.

In 8 hours' steady operation, a Jaeger averages 72,000 fewer revolutions, saving miles of engine piston travel and pounds of fuel. Because operation is always below the continuous horsepower curve, engine maintenance is lowest. As for the compressor unit, *many Jaegers have been operated more than 8000 hours without replacing a single vane.*

Similar high efficiency at low speed (1700 rpm full load speed compared with 1800 to 2150) is characteristic of Jaeger 125, 250 and 365 models. Check with any Jaeger user—or ask your Jaeger distributor for complete information that will help you cut your air costs on coming work.



Jaeger oil-cooled 2-stage, single axis compressor unit — the first fully efficient rotary compressor. All sizes average an output of 500 cu. ft. of 100 psi air per pound of fuel consumed.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

PUMPS • SPREADERS • FINISHERS • CONCRETE MIXERS • TRUCK MIXERS

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Ontario cement firm

continued from page 99

the kiln basins. Three 4-in. pumps (one a standby) deliver slurry finally to each kiln.

The burning section consists of two identical coal-fired rotary kilns and auxiliary equipment located in a building parallel to the storage hall. As in other sections of the plant, automatic and accurate control is featured in the kiln section. Design of each 402-ft. kiln, plus control over every phase of the burning process, is sufficient to gain maximum production efficiency and high-quality product. The kilns are said to have the largest capacity of any on the continent, peak capacity being 5,700 bbl. (U.S.) per day.

Diameter of the calcining zone in each kiln is 11 ft. 6 in., while the pre-heating and burning zones have a 13 ft. 2 in. diam. Kiln lining is of 6- and 9-in. refractory bricks, but one kiln has about 100 ft. of insulating brick in the calcining zone. Good heat exchange is obtained with 70 tons of 1 and ¾-in. chains in the preheating zone. Kiln speed is 1 rpm.

Flow of slurry to each kiln is measured and controlled through a ferris-wheel feeder. The feeder is synchronized with the kiln drive motor. The density of the slurry flow to the kiln is measured by a gamma-ray counter. Results are shown on a continuous recording meter at the central kiln panel.

Hot clinker is discharged from each kiln into an air-quenching cooler. Large lumps are reduced in a clinker breaker at the discharge end of the cooler before going by bucket elevator to the storage hall. The clinker-handling system is vented to a dust collector with a capacity of 11,600 cfm.

Dust collection in the burning section received much attention in plant design. Kiln exhaust gases pass first to a Multiclone, which removes 70 percent of the dust. Then it goes to a 120,000-cfm. electrostatic precipitator that has a guaranteed efficiency rate of 99.2 percent. Gases are exhausted to the atmosphere through a 554 ft. high stack of unusual design. Designed and built by Canadian Kellogg Co., the stack consists of two completely separate shafts. The outside one, of concrete, has a diameter of 37 ft. at the bottom and 23 ft. 6 in. at the top. The inside shaft is of bricks and has a bottom diameter of 25 ft. 8 in. The space between the two is used for a spiral staircase. Purpose of the inside shaft is to prevent kiln exhaust gases from contacting the concrete outer shaft, which takes care of wind loads.

Collected dust from the Multiclone and precipitator is passed over on a 2 x 4-ft. vibrating screen, then sent to a silo near the feed end of each kiln. From there it is pumped to a feed silo above the burner floor. Mixed with primary air and pulverized coal, it is fed into the burning zone of the kiln. (See ROCK PRODUCTS, August 1955, p. 93)

Coal is dried and pulverized to 80 percent passing a 200-mesh sieve in a Raymond Bowl mill that has capacity for 8.5 tph. Hot air is drawn from the kiln hood and the clinker cooler, and is cleaned in a Multiclone before it passes through the mill for coal drying and coal transportation. The entire coal-handling system is vented to a bag filter.

The cement mill section has a completely automatically controlled feed system similar to that of the slurry grinding section. Electrically interlock proportioning-feeders serve to feed the clinker, gypsum and other additive materials. Five identical mills are installed, each working in closed circuit with an air separator. Each is a 10 x 28-ft. two-compartment Compeb mill with a speed of 16.8 rpm. Four mills have wave-type manganese liners, and one has a special studded type of liner (Henricot). Total charge of each mill is 193,000 lb. of balls ranging from 1¼ to 3½ in. in size. Output of each mill is 185 bbl. per hour when grinding Type I cement.

Four collecting 10-in. Airslides carry finished cement from the separator to a group of three 7-in. cement pumps. Airslides, chutes and pumps are arranged so that each pump can be fed from each mill system, to provide flexibility in the pumping system. Three 8-in. pipe lines carry the cement to the packhouse. All transfer units and the air separator are vented to a dust collector; collected dust is returned to the mill outlet.

The packing house is designed for flexibility and ease in bag or bulk-loading onto trucks or into railroad cars. Two parallel rows of ten 38-ft. diam. concrete silos each are arranged operationally into five groups of four silos each. A group is equipped with Airslides, a surge bin and a four-spout bagging machine for truck or railroad-car loading, and with gravity-flow bulk loading into both types of carriers. All equipment in each group, including the silos, is connected to a dust collector. It is expected that 65 percent of all cement will be handled in bulk.

A bulk-loading station is also provided at the specially constructed wharf. It consists of two 850-ton silos and a shuttle belt conveyor. Silos are filled by special blow-type bulk carriers mounted

Please turn to page 164

No Loading Bottlenecks with Dependable MANITOWOC Performance!

When there's a Manitowoc in your pit, trucks keep moving . . . production never slows down. That's because dependable, bonus-capacity Manitowocs take bigger bites, deliver bigger payloads. And rugged simplicity of design keeps output steady under the toughest digging conditions. Here are some of the outstanding Manitowoc features that pay off in *any* pit operation . . .

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Manitowoc

MANITOWOC ENGINEERING CORP.

MANITOWOC, WISCONSIN

CRANES	SHOVELS	DRAGLINES	TRENCH HOES
20 TON - 100 TON	1-YD. - 5½-YD.	1-YD. - 6-YD.	1-YD. - 2½-YD.

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Ontario cement firm

continued from page 162

on semi-trailers. The self-unloading "Pneumex" carriers can unload over a distance of 100 ft. and 40 ft. high. Use of this equipment allows silos to be filled so that a boat can get a full load from the silos and the working carriers in a 10-hr. period.

A laboratory in the mill building consists of five departments that are equipped with modern apparatus for all required control tests, analyses and scientific studies of problems in cement manufacturing process. Samples reach the laboratory by a pneumatic-tube system. Tests are made for proportions of material, water content, fineness, etc. Slurry samples also are checked for viscosity and for sedimentation and mixing characteristics. Cement fineness is checked every hour. An analysis of clinker is made every day. Chemical composition of dust is also checked.

The company's general manager and executive vice president is Dr. Bernard Ulrich. Other staff officials include Paul Chapdelaine, secretary-treasurer and John Hiltemann, chief engineer. At the Clarkson plant, John Tweedy is sales manager; Herbert Egger is production manager and John Simons is maintenance superintendent.

MAJOR EQUIPMENT USED BY ST. LAWRENCE CEMENT CO.—CLARKSON PLANT

Plant design	St. Lawrence Cement Co.
Unloading hopper feeders, vibrating	Syntron Co.
Shale crusher, single-roll, 30 x 50-in.	Pennsylvania Crusher Co.
Primary impactor, 450 tph.	Pennsylvania Crusher Co.
Belt conveyors, 30 in.	Stephens-Adamson Co.
Scalping screens, vibrating, 5 x 12 ft.	Canadian Allis-Chalmers
Dust collectors, bag type	Northern Blower Co.
Overhead cranes, 20 ton	Provincial Engineering Co., Ltd.
Vibrating feeders, *Waytrol*	Jeffrey Mfg. Co. of Canada Ltd.
Slurry mills, 8 x 37 ft., three comp. *Compeb.*	Canadian Allis-Chalmers
Slurry pumps, 4, 6 in.	A. R. Wilfley & Sons, Inc.
Slurry basin agitator, SX	The Dorr Co.
Rotary kilns (2), coal-fired, 13 x 402 ft.	Canadian Allis-Chalmers
Clinker cooler, air-quenching	Fuller Co.
Clinker crusher, *Hydrocone*	Canadian Allis-Chalmers
Electrostatic precipitators w/*Multiclone*	Precipitation Co. of Canada
Airslides and pumps	Fuller Co.
Coal mill, *Raymond Bowl*	Combustion Engineering, Inc.
Cement mills (5)	
10 x 28-ft. 2-comp. *Compeb.*	Canadian Allis-Chalmers
Air separator, 16-ft.	Sturtevant Mill Co.
Bagging machines (5), four-spout	St. Regis Paper Co.
Bulk cement carriers, self-unloading, *Pneumex*	Polysius Gmbh.
Air compressors (3) two-stage, water cooled	Canadian Ingersoll-Rand
(3) single-stage rotary	Fuller Co.
Electrical transformers 5,500 KVA	Brown Boveri (Canada) Ltd.
1,000 KVA	Westinghouse Electric Corp.
Electric motors for slurry and cement mills	General Electric Co.
Ro-Tap sieve shaker	Fisher Scientific Co., Montreal, Canada
Abbe laboratory mill	Fisher Scientific Co., Montreal, Canada
Cenco-Meinzer sieve-shaker	Central Scientific Co. of Canada
Analytic balances *Gram-atic*	E. Mettler, Zurich, Switzerland
Brookfield Synchro-Lectric Viscometer	Brookfield Eng. Laboratories Inc., Stoughton, Mass.
Pneumatic tube system	Grover Transitubes of Canada Ltd.
"Henricot" liners of cement mill No. 4	Jolliette Steel Division of Dominion Brake Shoe Co.
Galileo-Galilei apparatus for tensile and bending strength ASTM	Eich, Maumary & Co., Milan, Italy

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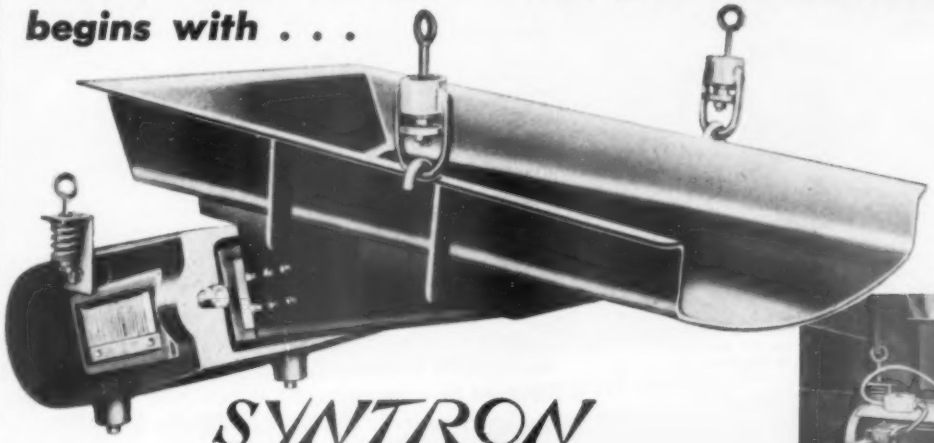

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SYNTRON Vibratory Feeders are made in a series of single electromagnetic drive models with maximum capacities ranging from 25 to 1,000 tons per hour — and up to 3,000 tons per hour with multi-electromagnetic drive models. All with variable control of feed rate — for operation from 230 or 440 volt, 60 cycle a-c.

SYNTRON Vibratory Feeders can provide the dependable answer to a lot of your bulk materials handling problems.

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Note: large rock and fines

Feeding damp sand to conveyor belt
Note: SYNTRON Vibrator on sand hopper

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- Vibratory Screens
- Shaker Conveyors
- Vibratory Elevator Feeders
- Weigh Feeders
- Packers and Jolters
- Hopper Feeders
- Lapping Machines
- Rectifiers (Silicon and Selenium)
- a-c to d-c Selenium Rectifier Units
- Electric Heating Panels
- Electric Heating Elements
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- Concrete Vibrators
- Paper Joggers

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Test your tax I.Q.

continued from page 101

it might even help you to forget your poker losses —which is the thing to do, because net gambling losses are definitely not deductible. Net gambling gains are taxable as income; so if you won money in a football pool you may use your poker losses to offset these gains. The answer is (c).

Last October your car skidded on a wet road and grazed a telephone pole. The damage was not covered by insurance and it cost you $100 to have the car repaired. To claim a casualty deduction . . .

(a) You must have the damage repaired within 30 days of the accident
(b) You may simply deduct the amount of the repair bill
(c) You must prove that you were using the car in your work at the time

The IRS has ruled that "if the repairs do nothing more than restore the property to its condition immediately before the casualty and do not add to (its) value, utility or useful life, such repair costs may be used as a measure of the value of the destroyed portion." Where you were going at the time of the accident does not affect the deductibility of car damages. The answer is (b).

Which of the following may you NOT consider as a deductible business expense . . .

(a) A subscription to Rock Products
(b) Commutation fees
(c) The costs of attending a convention

Commutation fees are not a deductible business expense. The cost of going to and returning from work, whether it be by bus, cab, train or plane, is not deductible since it is a personal expense. On the other hand, a and c are deductible. The answer is (b).

While playing hide-and-seek in your backyard, the neighbor's children trampled and killed several of your more expensive bushes. The cost of replacing this shrubbery . . .

(a) May be deducted if it does not exceed the original cost of the bushes
(b) May be deducted only if the parents of the children refuse to pay damages
(c) May not be deducted under any circumstances whatever

Please turn to page 168

● Check the Jeffrey line when specifying parts or accessories for any of your materials handling jobs. Jeffrey products have been time-tested on original equipment and as replacements in all kinds of industrial applications. Their design, materials and workmanship are of the finest, assuring efficient, low-cost service.

Jeffrey transmission products are widely known for quality and dependability. Many of the most popular types of chain were originated and patented by Jeffrey and since have been adopted as standard throughout industry. Send for complete data. Distributors in principal cities. The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

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STANDARD WING-TYPE SELF-CLEANING PULLEY

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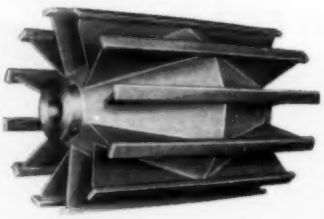
- LONGER LIFE
- GREATER STRENGTH WITH LESS WEIGHT



Reinforced all-steel welded construction of this Standard Pulley provides longer service, lower operating costs, greater efficiency. Built to deliver maximum service under severe operating conditions, the self-cleaning design combines far greater strength with less weight.

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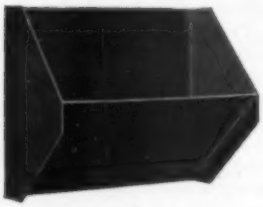

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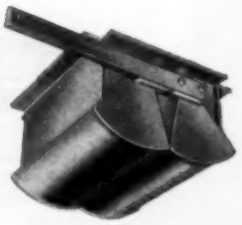

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Test your tax I.Q.

continued from page 166

Damage to your shrubbery caused by children, dogs or errant lawnmowers is not deductible. If your home or lawn is damaged by fire, storm or flood the loss not covered by insurance may be deducted. When large amounts are involved it is wise to have an expert appraisal made immediately after the casualty. The answer is (c).

Your 16-year old son works during the summer for you in your unincorporated business, and you pay him a weekly salary. Since he is a full-time employe, he is . . .

(a) Required to pay social security
(b) Not subject to social security
(c) Permitted to decide whether he does or does not want social security coverage

Since your sons works for you, you are not supposed to pay social security tax on his wages, nor is he required to make contributions. If your business is incorporated, however, the corporation must pay social security tax on his salary. The answer is (b).

Last year you gave your church a small piece of property for which you had paid $500 some time ago. Its value at the time of the gift was $1,500. As a result . . .

(a) You may claim a tax deduction of $1,500
(b) You must pay a capital gains tax on the $1,000 increase
(c) You may claim a tax deduction of $500

Your deduction for a charitable contribution is the value of the gift at the time it is made. You are not considered to have realized a taxable gain or deductible loss when you give property away. You may claim a deduction for the entire $1,500 so long as this amount does not exceed 20 percent (30 percent in some cases) of your adjusted gross income. The answer is (a).

There were a few leaks in the shingle roof of your office building; so you constructed a new tile roof. You should . . .

(a) Consider this as a repair bill and deduct the entire amount as a business expense
(b) Regard this as a capital improvement and depreciate the cost over a period of years

Please turn to page 170

Tailings Go to Market - Separated by Sturtevant

10% WASTE SCREENINGS CLASSIFIED INTO PROFIT-MAKING PRODUCTS

Hills of bothersome tailings at a Mid-western rock-crushing plant are being classified into saleable products — agricultural limestone and sand for cement blocks — by a 10 ft. Sturtevant Air Separator. No extra men are needed to supervise the almost automatic unit — operating in rugged outdoor service. Screenings previously thought to have no commercial value are now going to market — **at a profit.**

THE SEPARATOR THAT UPPED 40 TO 400 MESH OUTPUT AS MUCH AS 300%

Sturtevant Air Separators range from 3 to 18 ft. in diameter: deliver fines from 40 to 400 mesh at rates as high as 65 tons per hour . . . in the cement industry, have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills.

Designed to cut costs and build profits, Sturtevant Air Separators give a lifetime of high-efficiency, low down-time service. Rugged construction plus easy accessibility for quick maintenance (typified by the "Open-Door" design in other Sturtevant equipment) assure more output per machine year.

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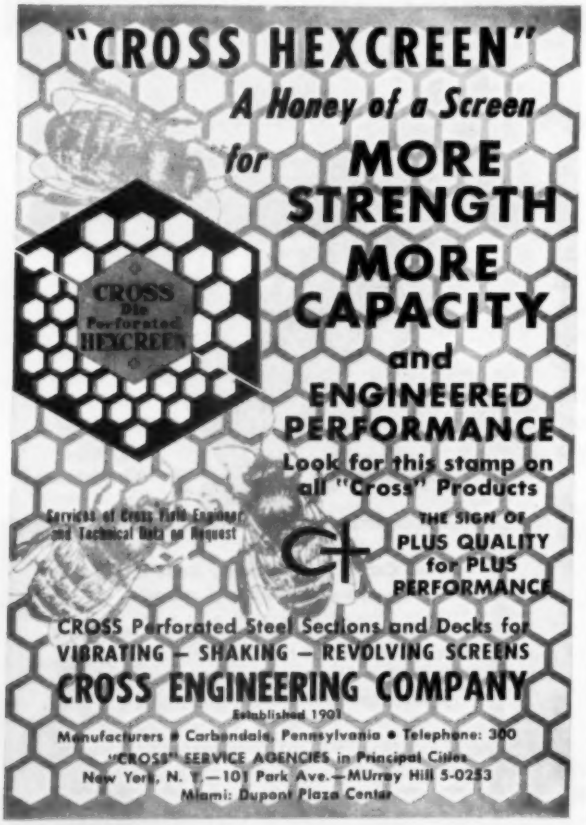
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Test your tax I.Q.

continued from page 168

(c) Add the cost of the repair to the value of the property

The roof is considered an improvement, not an ordinary repair. The cost of replacing the roof is deductible as depreciation spread over its estimated useful life. The answer is (b).

After you have filed your personal 1957 tax return, the Government is allowed to check your return and bill you for additional tax. The period of time in which this may be done ends . . .

(a) On the day you file your 1958 return
(b) Two years after you file your 1957 return
(c) Three years from the due date of your 1957 return

In the absence of fraud or substantial understatement of income, the Government has three years from the due date of your 1957 return to check your return and bill you for additional tax. Since the due date of most individual returns is April 15 and for investigation purposes all returns are treated as though filed on the due date, you should be sure to save all check stubs and receipted bills to prove your declared deductions until April 15, 1961. The answer is (c).

On the advice of a friend, you engage a CPA to prepare your 1957 tax return. The fee he charges for this service is . . .

(a) Not deductible since it is considered a personal expense
(b) Not deductible if you are entitled to a refund
(c) Deductible in full

The fee which a CPA charges you to prepare a tax return or defend the accuracy of your return before the Treasury Department is deductible in full if you itemize deductions. The answer is (c).

END

Sand, gravel firm is incorporated

THE CHARLESTOWN SAND & GRAVEL CO., Ravenna, Ohio, has been incorporated by Harold Stein, C. A. Covington, Jr., and Charles P. Henderson. Three hundred shares of common stock were authorized.

Mr. Stein, president, said the company will supply sand and gravel to construction and building supply companies. Sidney Gelman of Lorain is vice president; Mr. Covington is secretary-treasurer.

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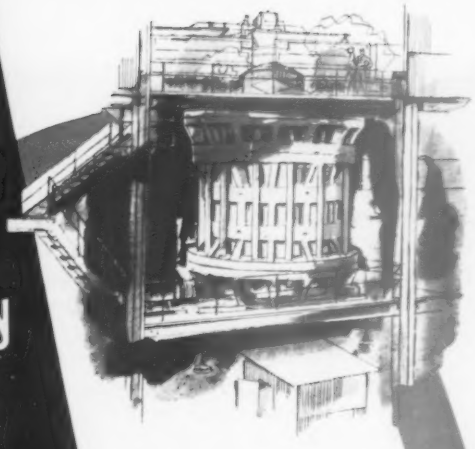

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The most important reason behind this preference for Symons is the fact that these soundly engineered, heavy duty crushers produce more material to desired specifications, use less power, give maximum life of crushing members and, in most cases, require less operating personnel.

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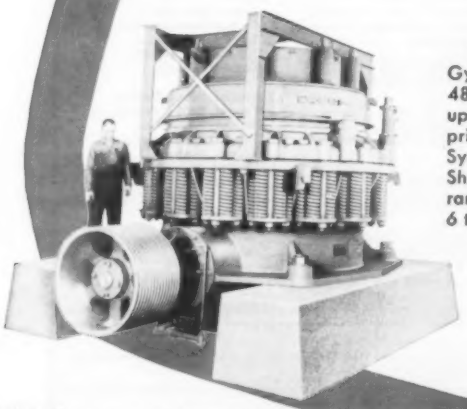

For heavy duty primary breaking, Symons Gyratory Crushers are available in 30", 42", 48", 54", 60" and 72" sizes, for capacities up to 3500 and more tons per hour. For primary, secondary and finer reductions, Symons Cone Crushers, in Standard and Short Head types, are available in sizes ranging from 22" to 7'—in capacities from 6 to 900 or more tons per hour.

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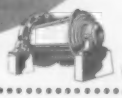

NORDBERG GRINDING MILLS

NORDBERG MINE HOISTS

SYMONS VIBRATING GRIZZLIES and SCREENS

NORDBERG ENGINES

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C457

Azbe's world trip

continued from page 112

left just 50 years ago. Those 50 years I have spent in the United States. I left as a boy of 17 without any particular knowledge or trade and without any means of support. The only motivating urge was the craving to make a trip around the world. I got as far as America by somewhat peculiar means. Here I have stayed through an interest in engineering and in lime, which later developed. It is now after exactly 50 years that I will satisfy my boyhood ambition of a trip around the world, and return to Austria, but in what a different fashion than I left it!

Following Austria there is an engagement in Germany and in Spain. A consultation in London and at the end, the placing in operation of two large kilns in Norway. These kilns are very unusual in that they are suitable for alternate or combination firing with either fuel oil, carbide furnace gas, or coke by the mixed-feed principle.

This is but a short outline of that with which I am confronted; there is far more to it which with the details may be covered by future articles. The whole represents quite an undertaking for a man of my age. In the earlier part of the morning before my system is fully awake I fear the trip. "Why do you get yourself into such a predicament?" I ask, but later in the day I get quite anxious to go.

END

Stone plant

continued from page 109

becoming full. Washed aggregates are stored in bins fitted with air-operated gates. An operator in an elevated control room observes and controls the flow of stone into trucks. Trucks haul the wet rock to storage areas where it can pile-drain.

All shipments are now made by truck from the Rock Cut plant, but the storage bins were laid out to accommodate gondola cars for rail shipment. A rail spur will probably be installed soon.

Part of the output of this new plant is made into asphalt concretes right on the property and provides a diversified outlet for the plant production. A battery of four 40-ton bins holds aggregates above a belt conveyor. The mixerman can select from one to four sizes of stone, and can vary the flow of each size out of the bin through vibrating feeders. The capacity of the asphalt concrete plant ranges from 90 tph. for top courses to about 120 tph. for binder courses.

END

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___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyer
___Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Convertors
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.
___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____
All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired
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NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

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Saving	– in cement and pozzolan alone - per yard **$1.17**

WEMCO

WESTERN MACHINERY COMPANY
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SAN FRANCISCO 7, CALIFORNIA

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To expand or not to expand?

continued from page 148

There is no rule for what payout time is proper for any specific type of project. This is established by groups of people based on their own experience and by comparison with what other payout they can obtain from similar or other projects.

By proper use of profitability calculations many comparisons can be made between alternate methods of expanding. It is suggested that each alternative be set forth in a projected profit and loss statement and analyzed in detail. Where two schemes are to be considered, both should be tabulated and the differences compared.

Where the schemes are relatively close in payout but substantially different in total investment, the differences of investment as compared to the differences in cash return will show whether the increment is attractive.

For example, consider Scheme A of a $150,000 investment for a rock crusher location which will permit a 1.46 year payout by savings in truck haul. Scheme B with a $200,000 investment for a larger crusher shows a 1.68 year payout. However, the difference of $50,000 will only payout in 3.03 years. Relatively, the increased investment is found to be unattractive.

Similar calculations can be used to establish sales prices where competitive products do not exist. The procedure is to determine the desired payout time in years. From the known estimated cost of facilities, the net cash return can be determined and then the calculations proceed as in the first example but entirely in reverse. This would establish one basis for pricing a new product.

Payout calculations have true meaning because of comparison between projects and because of their establishment of a standard. They are only as accurate as the estimates which make a part of the payout calculations. They assist management in correlating all of the estimates prepared by the department heads. They are not expected to replace critical insight on the part of management but rather to help correlate the vast amounts of data which must be digested before a decision on expansion is made.

END

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Tire-roller placement

continued from page 131

rial, it will travel downhill across the rollers at a speed that is twice the natural slide of tires across rollers, since roller skew is assisting the rate of slide instead of balancing it. If a kiln runs back several times in quick succession, as will occur during a "burn back" (when the kiln is driven for several short periods on bottom speed to treat material that has flooded into burning zone) the thrust tire will contact the bottom thrust roller, and be forced more and more heavily against it.

There are only two satisfactory systems for the adjustment of kiln rollers:

- When surfaces are dry and rollers equally skewed, thrust rollers act as limits only. When surfaces have become polished, the kiln is kept at light pressure on the top thrust roller, that is, in contact for one-quarter of a shell revolution. The conical edge of the thrust tire that contacts the thrust roller will be polished; a lower dull portion shows that the thrust tire is weaving, and contacts the upper thrust roller for only a small part of a kiln revolution. (See Fig. 4.)
- When rollers are set almost parallel to the kiln axis, and surfaces are kept treated with a lubricant of high viscosity and good adhesive properties, kiln slide rate will be about ten times higher than for clean surfaces. The kiln cannot be kept off the bottom thrust roller unless very large amounts of skew are used; this will damage surfaces and rapidly shear away the lubricant. The bottom thrust roller then carries full axial load of the kiln.

END

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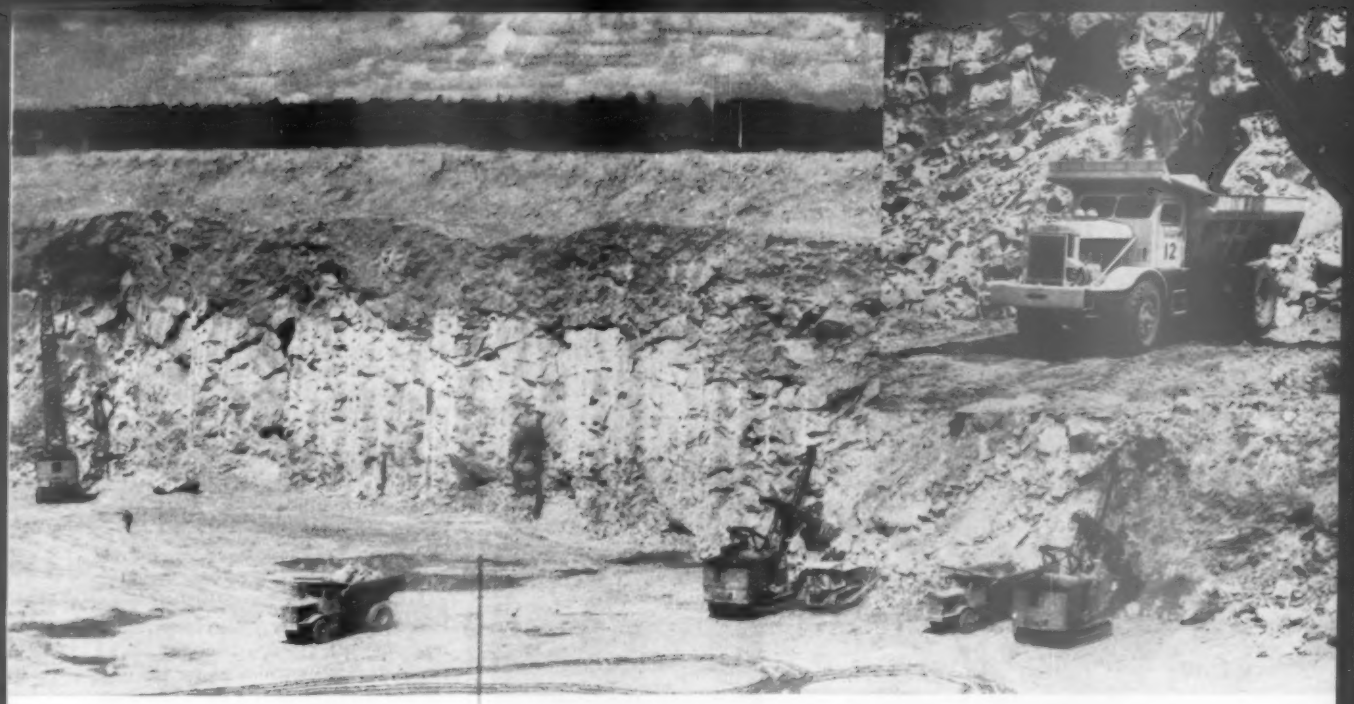

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with "Euc" Scrapers and Rear-Dumps

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Faced with moving a million bank yards of clay and 500,000 tons of gypsum rock, National Gypsum evaluated all makes of equipment—bought four "Euc" Scrapers, including an 18-yard Twin-Power model, and six 22-ton Rear-Dump Euclids for the rock movement. Sixteen months after the starting date, this big quarry site was stripped and graded—right on schedule. To fully clean the initial 15-acre quarry block, 7 million yards of clay are expected to be moved.

During early production at the quarry, four Rear-Dumps were hauling 5500 tons of ore to the hopper in an 8-hour shift. The haulage fleet is now composed of 10 of these reliable 22-ton "Eucs" used in the quarry and in the stripping operation in conjunction with a dragline. Six Euclid trucks currently used in the quarry deliver up to 1000 tons of gypsum per hour to the primary crusher bin.

Have your Euclid dealer give you information on the complete line of Scrapers, Rear-Dumps, Bottom-Dumps and Crawler Tractors...he has proof that ***Euclids are your best investment.***

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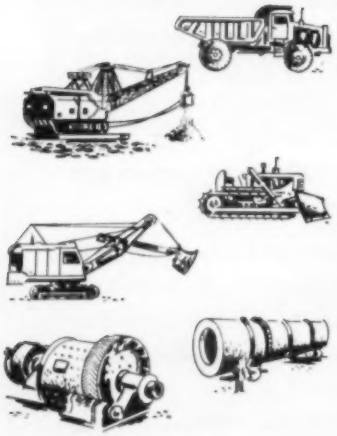

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ROCKY'S NOTES

(Continued from page 18)

been in the western states and Canada, but almost all geologically-old rock wherever found contains some of these rare elements.

Prospecting Aid: A recent little book entitled "Prospecting for Atomic Minerals,*" by Alvin W. Knoerr and George P. Lutjen, editors of **Engineering and Mining Journal,** is designed especially for helping such amateur prospectors. While aimed primarily at prospecting for uranium deposits it also tells where to look for such other atomic minerals as thorium, beryllium and lithium. For example, it gives tables listing color, streak, luster, hardness, specific gravity, fusibility, habit, occurrence chemical tests for identifying minerals containing these elements. The various implements and tools for prospecting are also described. Of course, the most popularly known instrument is the Geiger counter for prospecting sources of radioactive minerals such as uranium.

Our readers may suppose that deposits of ore of commercial grade are found only in the Rocky Mountain States, but a map of known sources of uranium minerals includes many places in the Appalachian Mountain range from Vermont and New Hampshire to Georgia and Alabama. Of course, the richest ores are being and will be first exploited—and first exhausted. But where mining for some rock product is already in progress it may be economical to carry a separation process, as in the case of Florida phosphate processing, far enough to concentrate the uranium or other ore incidentally encountered—at least the prospect of finding it makes the rock products operation more interesting.

The discovery of beryl in enough quantity for exploitation is particularly desirable. Commercial quantities are found in the United States in New England, the Black Hills of South Dakota and Colorado in pegmatites and less concentrated in the pegmatites of various other states. Some of us, of course, need to know what a pegmatite is, and how to recognize it if we do see some. Pegmatites are described as the residual portion of the magma (the original molten rock)—the last minerals to harden or solidify, and in them are concentrated many valuable minerals, such as we have referred to above. This pegmatite part of the magma was originally very fluid and it was intruded in fluid form as dykes,

*Published by McGraw-Hill Book Co., 330 West 42nd St., New York 36, N.Y. Price $3.95.

stringers and veins mainly around the borders of granitic rocks. The more common minerals thus concentrated are feldspar, quartz, mica, etc. So, Mr. Quarryman, when you encounter such dykes, stringers and veins, it may be profitable to call in a specialist to see what you have.

However, such useful minerals are not confined to pegmatite veins, etc., in existing rocks. Many such rocks have disintegrated and washed away, have been deposited somewhere else as sand and gravel, clay, shale, etc. Quartz pebbles are fairly common in some gravel deposits. The same deposits may contain some of the other minerals from the decay of pegmatites not so easily identified, and in such small proportions that they would never be found unless search is made especially for them.

Other elements especially to be desired are titanium, zirconium, strontium, selenium and numerous others. The best known of these is titanium because the ores ilmenite and rutile containing titanium oxides are mined in various parts of the Appalachian Mountain Range in our Eastern States and in sands in Florida. It is a common ingredient of basic igneous rocks. Strontium is often found in association with dolomitic limestones in Ohio.

The book we have referred to is a practical guide for prospecting any mineral. The chapter headings are (1) Your stake in atomic minerals; (2) How to recognize uranium minerals; (3) Where to look for uranium; (4) Where to look for other atomic minerals; (5) What you should know about mining laws; (6) How to stake out a lode claim; (7) How to prospect; (8) Radiation: what it is and how to detect it; (9) When you find atomic minerals; (10) Aids to prospectors; (11) Important facts to remember.

If one becomes interested in the possibility of finding some mineral of value on his property, it is almost inevitable that he become interested in the source of such mineral. This leads to an interest in geology and geochemistry, and to our mind this cannot but help make even the prosaic work of excavating a gravel pit more interesting. For example, as proof that you can't tell what a few feet of sand and gravel may conceal, our authors, quoted above, report a Geiger count of 50-52 over sand and gravel and similar materials near Princeton, N.J. The home of Princeton University undoubtedly has many enthusiastic experimenters who know how to use Geiger counters. However, it could happen in your gravel pit.

We might go on somewhat indefinitely to show you that you may find

(Continued on page 180)

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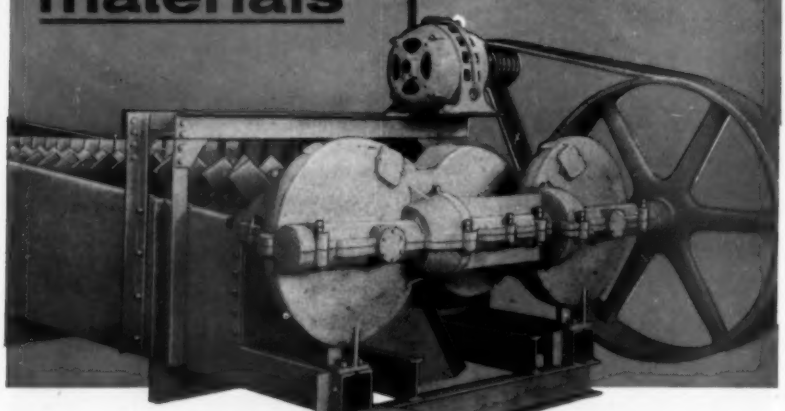

McLANAHAN SINCE 1835

LOG WASHERS

McLANAHAN & STONE CORPORATION

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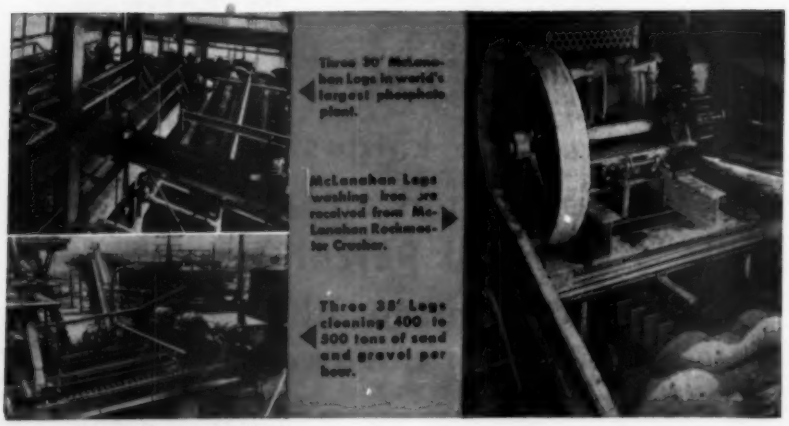
Three 30' McLanahan Logs in world's largest phosphate plant.
McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.
Three 38' Logs cleaning 400 to 500 tons of sand and gravel per hour.

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ROCKY'S NOTES

(Continued from page 179)

romance in your own operation. We conclude only with the suggestion that any piece of stone or grains of sand that look unusual or interesting to you maybe should be saved for an expert to see. The peculiarity that attracts attention may be color, weight, luster, hardness or any other quality that seems unusual to your observation. Diamonds are said to have been detected in Wisconsin gravels. We know that sand and gravels from Colorado, California, Missouri, Michigan and elsewhere have often contained detectable amounts of gold dust. It simply hasn't been considered economical to separate it out. But some of these other rare minerals referred to above are worth more than gold, for they have industrial uses highly essential to modern chemistry and metallurgy, that in turn have become essential to our National Defense.

END

Suspends cement production

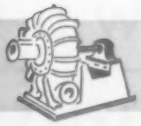
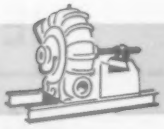
MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., plans to suspend production at eight of its ten plants for periods ranging up to eight weeks during the first quarter of 1958, company officials announced. Full storages and light demand, which are expected to continue through March, were given as the reasons for the shutdowns.

Production was halted at its Nashville, Tenn., plant Sunday, December 22, and was resumed January 6. Temporary closing was planned also for the plants at Brandon, Miss., Rockmart, Ga., Superior, Ohio, Des Moines, Iowa, Cowan, Tenn. and Cape Girardeau, Mo.

"FOR A BETTER-READ, BETTER-INFORMED AMERICA"

National Library Week
March 16-22, 1958

Another Customer Speaks

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Mr. Allen agrees with what so many other Sand & Gravel Producers say!

S. G. Allen, Contractor and Ready Mix Concrete Producer, Memphis, Tenn., built a new sand and gravel dredge a year or more ago and naturally wanted the most efficient and durable pump available. Consequently a Thomas Durable Dredge Pump, series JL 8" discharge went into this dredge in January, 1957. This is a new, modern and beautifully maintained dredge of which the owners are justifiably proud.

"This pump doubled our production", he says, "and in 9 months operation we have had no pump repairs, no down-time, no excessive wear. In this time, our old pump would have required two suction liners."

So, there is the same old story again: "You cannot buy at any price, a more durable pump for sand and gravel, then a THOMAS—you cannot buy another pump that will make you as much money."

There's a reason. For an explanation, write to:

THOMAS PUMPS AVAILABLE IN SIZES 6" THROUGH 16".

MR. ALLEN'S THOMAS DURABLE DREDGE PUMP

S. G. ALLEN Contractor

November 29, 1957

Thomas Foundries, Inc.
P. O. Box 1111
Birmingham, Alabama

Gentlemen:

In January, 1957 our company installed a Series JL Thomas Durable Dredge Pump with a 10 inch suction and an 8 inch discharge on a newly constructed dredge. After nine months of operation we are more than proud of the service received from this pump.

To date we have not installed a single replacement part, nor have we had any down time during that period. A recent inspection showed no excessive wear on the pump parts. During the same period of time our old pump and dredge would normally have used two suction side liners while pumping less than half the sand tonnage produced by the Thomas Pump.

As you can see we are pleased with our new Thomas Pump and would heartily recommend it to anyone in a similar type of dredging business.

Yours very truly,

William S. Allen

THOMAS FOUNDRIES, *Inc.*

P. O. BOX 1111 .... BIRMINGHAM, ALABAMA

NEW U. S. PATENTS

OLIVER S. NORTH

Recently issued patents on nonmetallic minerals*

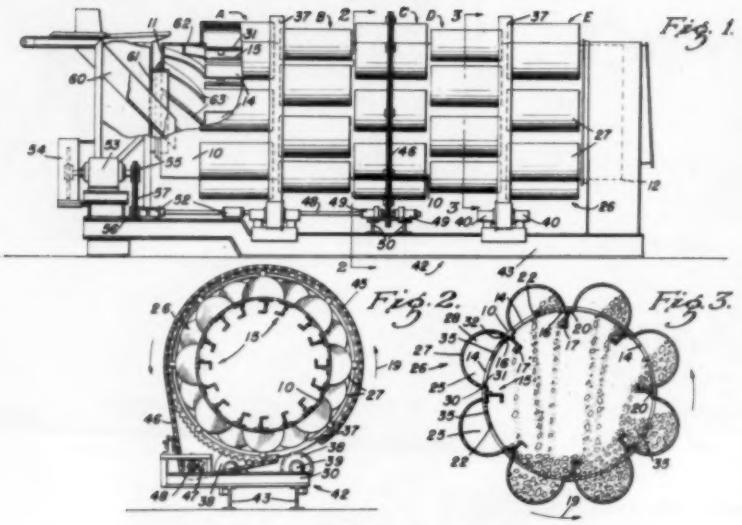


Fig. 1.

Fig. 2.

Fig. 3.

Diagram of U. S. Patent No. 2,815,940

Aggregates

2,815,940—Rotary apparatus for drying mineral aggregates, such as **sand, crushed stone** and the like. The machine has high capacity and is relatively inexpensive. The aggregate is carried further up and over in this device and then is dropped free-fall, creating aggregate "curtains" throughout the entire length of the dryer. Maximum heat efficiency is realized. (to W. M. Madsen.)

Figure 1 is a side elevation view of the apparatus, partly broken away at the feed end to show certain interior structural features. Figure 3 is a section view taken on line 3-3 of Fig. 1 (arrows denote direction of rotation).

Raw material is fed along chute (60) through inlet opening (61), where it is picked up by spiral vanes (63) and directed into the first circumferential bank of pockets (A). Individual pockets (25) are semi-circular or U-shaped and have angle-iron members (15) affixed to the following edges. As is well shown in Fig. 3, an angle-iron arm (17) retains most of the material until the pocket reaches approximately its highest point of travel, and the material then falls more or less directly downward. During its fall it is fully exposed to the drying effects of the heating gas used. The apparatus is inclined slightly from inlet to outlet end, so that the aggregate moves through rapidly.

2,815,815 — Method of controlling and consolidating loose sands in formations traversed by a borehole. The formation sand is impregnated by pumping into it a mixture of Ottawa **silica sand** and oil, followed by a second mixture consisting of oil and Ottawa silica sand that has been coated with liquid resin and a curing agent. The silica sand used should be of a particle size larger than the average size of the borehole sand particles. (to W. F. Hower and J. A. Knox. Assigned to Halliburton Oil Well Cementing Co.)

Lime

2,815,294—Method for stabilizing plastic, or clay, soil by admixing with it certain proportions of **lime,** fly ash and an inert common aggregate. Product is suitable as a road base. (to J. E. Havelin and F. Kahn.)

2,816,071-2—A low-water-loss drilling fluid comprises a mixture of water, clay, **lime** in an amount in excess of the stoichiometric amount capable of combining with the clay, sodium hydroxide to raise the pH of the fluid to at least 12, and, as a water loss reducing agent either karaya gum (2,816,071) or ground Irish moss (2,816,072). (to T. E. Watkins. Assigned to Socony Mobil Oil Co., Inc.)

Spodumene

2,816,007—Method of producing water-soluble lithium salts from silico-aluminous ores of lithium, particularly **spodumene.** Ore is calcined at a temperature between 1,050 deg. and 1,350 deg. C., finely ground, treated with sodium acetate or potassium acetate, and the reaction product cooled and extracted with water to obtain lithium acetate. The latter can be treated with an alkali carbonate to produce lithium carbonate. (to A. V. Kroll. Assigned to Compagnie Geologique et Miniere des Ingenieurs et Industriels Belges "Geomines" Societe par Actions a Responsabilite Limitee.)

Vermiculite

2,814,161—A comminuted mixture of peat moss and exfoliated **vermiculite** is used to retain moisture in this plant receptacle which is specially designed for facilitating the trimming of roots of a dwarf plant, such as a Ming tree or the like. Root trimming is done to prevent overgrowth of the tree. (to W. L. Hawkins.)

2,816,825—A growth medium for the propagation of plants to the transplant stage consists of a mixture of exfoliated **vermiculite,** a water-insoluble phosphate, and ammonium nitrate, the latter being combined with the vermiculite to provide an essentially water-insoluble source of nitrogen. When such a composition is used, plants require no "feeding" from the emergence to the transplant stage (to G. W. Schmitz and R. E. Rothfelder. Assigned to Zonolite Co.)

(Continued on page 184)

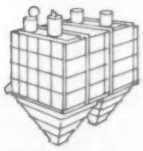
*Copies of United States patents are available at a cost of 25 cents each from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

Buell Combination Cyclone-Precipitator installation at cement plant.

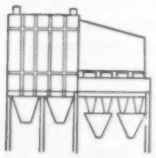
"Paid for itself!"

In nearly all cases, Buell dust or fume collection systems pay for themselves in just a few years. Buell "SF" Electric Precipitators provide extra collection efficiency *and* lower maintenance costs year after year, thanks to features like the exclusive high-emission, self-tensioning Spiral-ectrodes and unique Continuous Cycle Rapping. For specific information about dust collection efficiency and all three Buell systems, write for a copy of the booklet, "The Collection and Recovery of Industrial Dusts." Dept. 21-B, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

BUELL CYCLONE



"SF" ELECTRIC PRECIPITATOR



PRECIPITATOR-CYCLONE COMBINATION

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Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

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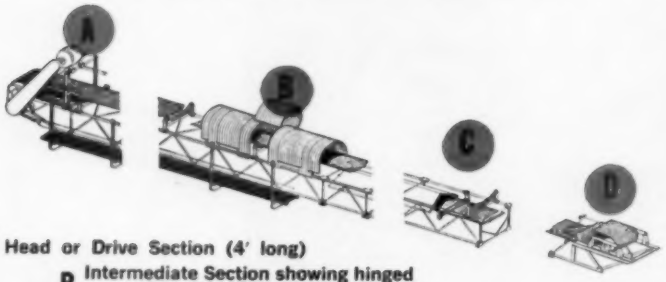
NEW IDEA in prefabricated belt conveyors

JOY READY-SPAN tubular design requires no special engineering



A Head or Drive Section (4′ long)

B Intermediate Section showing hinged cover (20′ –8′ –4′)

C Intermediate Section showing optional return belt cover

D Tail section showing takeup and belt plow (4′ long)

Just tell us the length, the speed, and the material you want to move and we can pull a Ready-Span prefabricated conveyor "off the shelf" for you. You'll get all the economies of pre-engineering plus all the advantages of a conveyor installation tailored to your needs.

Here's how it works: each section, including drive and tail terminals, is made up of four pipes connected by pipe diagonals forming a lace framed truss. Sections bolt together to form a straight, rigid, pipe frame truss.

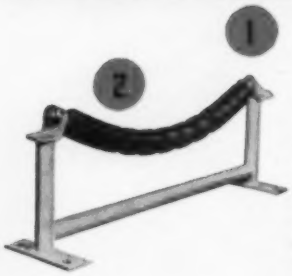
All accessories—idlers, walkways, cover decking, hoods and supports clamp to the pipe anywhere you wish—without burning holes or using pre-arranged multiple holes that weaken the conveyor.

The Joy Ready-span is available in a variety of drive and take-up combinations for any standard belt width. Promptly available from stock to meet almost any handling condition.

Write for Bulletin 218-27

NEW IDEA in conveyor belt idlers

JOY LIMBEROLLER



Write for Free Bulletin 218-27A

Radically different from all other idlers, the Limberoller is a single roll idler consisting of neoprene discs molded to a flexible steel cable. The entire idler turns on its own axis. (1) Only two bearings are used, one at either end, up out of the dirt. (2) The idler supports the belt across its entire width . . . eliminates gaps left by ordinary 3-roll idler. This even support, combined with cushioning "no-bump" action of neoprene discs, can increase belt life 6 times and more. The Limberoller can be installed on *any* belt conveyor, even on existing conveyors.

WSW L6987-218

JOY *Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*

In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Enter 1039 on Reader Card

NEW U. S. PATENTS

(Continued from page 182)

Phosphate rock

2,813,833—Method and apparatus for breaking down highly stable froths, especially the very corrosive froth produced during acid decomposition of **phosphate rock.** Froth is broken down by subjecting it to the forces obtaining in a gas vortex generated in an auxiliary gas. No moving mechanical parts are required. (to L. J. Revallier. Assigned to Stamicarbon N. V.)

2,815,859—Improved method of froth flotation separation of silica from phosphate during treatment of Florida **phosphate rock.** Instead of floating phosphate values in the first stage of the operation, silica is floated in a two-step rougher froth flotation, thereby eliminating the present de-oiling treatment of a rougher phosphate concentrate. (to C. A. Hollingsworth. Assigned to Smith-Douglass Co., Inc.)

Cement

2,814,204—Simple and direct conveying and sample taking apparatus for gathering representative samples from fluidized beds of granular or pulverulent solids such as **sand, portland cement** and the like. (to R. W. Moyle, Jr.)

2,815,987—Improved means for withdrawal of pulverulent materials, especially **portland cement,** from storage silos or bins. Material is maintained in aerial suspension in ducts whose tops are partly covered. With this method, the level of the material in the silo remains substantially horizontal at all times. (to K. J. Cylvest. Assigned to F. L. Smidth & Co.)

Mineral wool

2,814,828—Apparatus for collecting and removing **mineral wool** fiber from a rotating disk mechanism. Fibers are exposed to the successive action of two differently directed streams of air. Binder or lubricant is added after the second, horizontal air blast. (to A. K. E. Svende. Assigned to Hoganas-Billesholms Aktiebolag.)

Borax

2,815,729—Composite brazing pellet for brazing lead conductors to sealed beam lamp ferrules comprises an unsintered mixture of a flux and 50 to 70 percent Cu brass. **Borax** in the 74 to 420 micron range is the preferred flux material. (to I. S. Goodman. Assigned to Westinghouse Electric Corp.)

(Continued on page 186)

Russell H. Stewart Construction Co. Ltd. gets

100 TONS BONUS PRODUCTION PER DAY

with MURPHY DIESEL POWER

The Murphy Diesel powering this Commander Plant permits Russell H. Stewart Construction Co. to produce an *extra* 10 tons per hour of finished aggregate, according to a report from J. H. Godfrey, Vice President of the Orillia, Ontario company.

Figure the kind of profit *you* can make with the same kind of dependable, economical power.

If you work 250 days a year, those 100 extra tons per day add up to a 25,000-ton profit bonus . . . *because they're produced at no extra cost for labor, operation or maintenance!*

In fact, Murphy Diesels *reduce* production costs. As Mr. Godfrey reports, maintenance costs on their Murphy Diesel are "considerably lower." Low fuel costs and steady, uniform power add to Murphy's economical operation.

Figure the additional jobs you can handle, the lower bids you can make with the extra profit margin Murphy Diesels give you. Apply those extra yearly profits to the initial cost of your engine. You'll see why Murphy Diesel Power is your best buy on all counts.

Wherever your job is located, there's a dependable Murphy Diesel Dealer nearby. You can count on him for prompt, expert maintenance and parts service.

Murphy Diesel delivering 182 HP (continuous) powers plant producing crushed gravel for Ontario Dept. of Highways and for municipalities. "The Murphy Diesel is better," says the owner, "for starting in cold weather and in general maintenance."

MURPHY DIESEL

HEAVY-DUTY POWER for Rock Crushing

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

MURPHY DIESEL COMPANY

5315 W. Burnham St., Milwaukee, Wisconsin

SALES . . . PARTS . . . SERVICE

Throughout the Nation

379 RO

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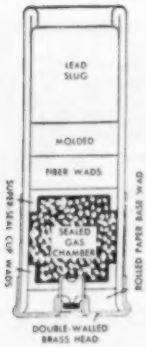
RINGBLASTER with Western® ammunition smashes kiln rings faster...



Smash kiln rings faster—hit more accurately—get far better firing results from *your* kiln gun with Western ammo! Western Super-X 8-gauge ammo develops a smashing force greater than any shell. And, ballistics tests proved this shell is 10% more effective when used in the new RINGBLASTER kiln gun.

Super-X 8-gauge ammunition is made of a special alloy that assures deeper "keyway" penetration . . . faster kiln ring disintegration. Fewer shells are needed, and down time is cut to a *new* low.

Additionally, the RINGBLASTER, with its baffled muffler, gives operators a measure of sound safety never before possible.

"Terrific improvement!" . . . "Impressed with its quieter operation!" . . . "Should have been done before!" . . . these are typical of the many favorable comments made by new users of this improved kiln gun.

RINGBLASTER is the *only* kiln gun to come factory-equipped with a muffler. Write for new catalog.

RINGBLASTER Kiln Gun

FOR SHELLS, SERVICE OR EQUIPMENT CONTACT
Rawson Fastening System
CLEVELAND 11, OHIO

Made by WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION
EAST ALTON, ILLINOIS

12177-B Berea Road • Cleveland 11, Ohio

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NEW U. S. PATENTS

(Continued from page 184)

Gypsum

2,813,778—Method for manufacturing lightweight, fluffy, anhydrous calcium sulfate of special utility as an insecticide carrier. The material can be produced from calcined **gypsum** or byproduct calcium sulfate obtained from the sea-water magnesia process or certain chemical reactions. Material is dewatered, calcined and micropulverized to obtain a product weighing about 20 to 25 lb. per cubic foot. (to C. M. Tidwell. Assigned to Food Machinery & Chemical Corp.)

2,815,542—Method of making and erecting a solid nonload-bearing partition formed from several layers of **gypsum** board, wherein pipes and conduits can be concealed without a special surface treatment. (to G. W. Baker. Assigned to United States Gypsum Co.)

2,816,436—Simple, sturdy wire clip for securing a course of **gypsum** wallboard panels to a support. (to N. Nelsson. Assigned to United States Gypsum Co.)

Talc

2,816,844—Ceramic material having high strength, relatively low shrinkage, and high resistance to thermal shock comprises 5 to 50 percent of fibrous **talc** to serve as a plasticizer and 95 to 50 percent finely divided mineral aggregate. Among suitable aggregates are cited **ball clay, kaolin** and zircon. Product is especially useful for lining metal vessels or crucibles, and for highly refactory molded parts. (to H. T. Bellamy.)

2,816,864—A free flowing, fire extinguishing composition comprises **talc,** sodium bicarbonate and tricalcium phosphate. This composition may be used on fires simultaneously with foam-producing agents without losing any of the advantages of either. (to W. R. Warnock. Assigned to Ansul Chemical Co.)

Gilsonite

2,814,595—Manufacture of open gear lubricants from viscous mineral lubricating bases having high asphalt content. Such lubricant base can be obtained from asphaltic crude oils or natural asphalts such as **gilsonite, grahamite** and **lake asphalt.** (to A. Beerbower and J. B. Henderson. Assigned to Esso Research & Engineering Co.)

(Continued on page 188)

NOTHING TRANSMITS POWER WITH SUCH RUGGED INDIFFERENCE TO ABRASION AS ROEBLING ROYAL BLUE WIRE ROPE. It is an operating quality that helps to make Royal Blue the most widely accepted wire rope in Roebling's history. Other characteristics that make Roebling Royal Blue the choice in many industries are: unique flexibility, shock and corrosion resistance above and beyond the call of duty and an over-all strength that puts new meaning in service life. For details of Royal Blue, contact your local distributor or write Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

ROEBLING
ROYAL·1105·BLUE
DESIGN
FOR WIRE ROPE
Its ready adaptability is evident wherever power is transmitted. It conforms to unique design requirements. Use wire rope to transmit power.

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NEW U. S. PATENTS

(Continued from page 186)

Kaolin

2,815,292—Method for speeding up the removal of water from high-grade clays, especially paper-coating **kaolin,** in conventional dewatering equipment. Aqueous raw clay is deflocculated, and gross impurities removed therefrom. The material is then classified and flocculated, and the flocculated clay slip heated in a heat exchanger to above the ambient temperature but below the boiling point. The slip is then dewatered, usually by filtering. Heating causes the slip to lose water much more readily and rapidly than does cold clay slip. (to W. F. Thiele. Assigned to Thiele Kaolin Co.)

Miscellaneous

2,810,158 — Method for making **mineral wool** having long filaments. Air or steam is directed tangentially to the stream of molten slag, and length of zone of action is 8 to 12 times the thickness of the slag stream. (to W. C. P. Smout.)

2,810,166—Method of forming a laminated "dry-wall" wall structure from layers of **gypsum** wallboard. Panels are affixed to each other with an adhesive consisting of casein, soy flour, trisodium phosphate, sodium pentachlorophenate, hydrated **lime, asbestos** floats, dry ground **mica** and ground **limestone.** (to N. Nelsson. Assigned to United States Gypsum Co.)

2,812,275—Protective coating for braze materials in salt bath brazing comprises **graphite,** a binder, and a clay such as **bentonite, kaolin** or a mixture of **ball clay** and kaolin. (to A. C. Francisco and C. A. Gyorgak. Assigned to Secretary of the Navy.)

2,813,035—Green molding sand for foundry use comprises **silica sand,** a petroleum oil and an amine-treated **bentonite,** for example, the commercial product "Bentone." (to N. A. Sauter and M. H. Horton. Assigned to Deere & Co.)

2,813,039—Substantial percentages of **china clay** are used in these formulae for manufacturing water-dispersible lead chromate pigments in dry powder form. (to J. E. Bishop. Assigned to E. I. du Pont de Nemours & Co.)

2,813,630—Fluidized bed apparatus for removing tramp iron and the like from pulverulent materials, such as **portland cement, gypsum, barite, bentonite,** hydrated **lime, talc,** etc. (to J. H. Morrow. Assigned to Fuller Co.)

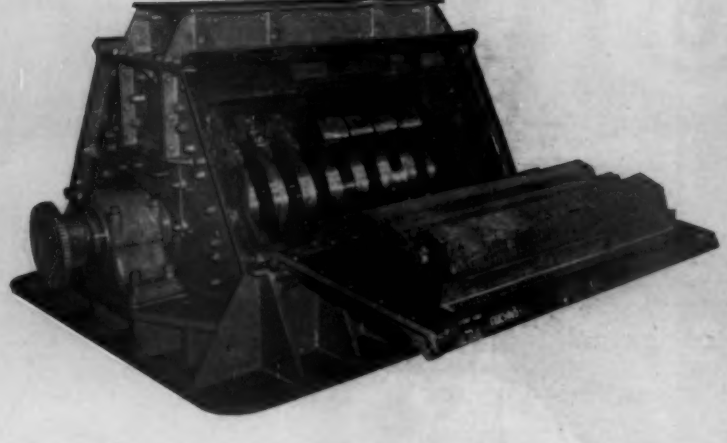
2,815,293—A white, quick-setting insulating finishing cement is prepared by admixing certain proportions of a thermal insulating material such as **mineral wool,** a setting cement such as **white portland cement,** a pozzolan cement, and a plasticizer. Among suitable pozzolan cements are mixtures of fly ash with **kaolin** or **ball clay** and/or **diatomite. Bentonite** is the preferred plasticizer. Product has the ability to expand and contract with varying temperatures. (to M. C. Randall and G. S. Gethen. Assigned by executors of estates to M. I. Randall and E. G. Gethen.)

2,815,552—A refractory mold coating composition comprises a bonding agent, minus 100-mesh silica flour, minus 40-plus 150-mesh **silica sand, sillimanite** or other refractory material. (to J. S. Turnbull and R. G. Nicholas. Assigned to Metropolitan-Vickers Electrical Co. Ltd.)

2,816,097—Use of **activated clay** in a process for separating nickel-diatomite or similar hydrogenation catalyst from hydrogenated polybutadiene. (to G. E. Hanson. Assigned to Phillips Petroleum Co.)

END

EASY TO "GET AT"



In a few minutes the top covers on either side of the Pennsylvania Reversible Impactor can be unfastened and swung back on hinges, exposing breaker blocks and liners, and making hammers and rotor assembly handily accessible for inspection, adjustment or repairs. Thus time for maintenance is held way down.

Since the rotor direction is reversible to run clockwise or counter clockwise, hammer turning is eliminated. Patented Adjustable Breaker Blocks enable you to get much longer wear from hammers and blocks, with no variation in hourly tonnage or uniformity of product. To get complete information on the crusher that is preferred by the cement industry two to one over all others for secondary crushing, ask for bulletin 6018.

Pennsylvania Crusher Division
Bath Iron Works Corporation
West Chester, Penna.

PENNSYLVANIA REVERSIBLE IMPACTORS

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FEEDING FLOATING PLANT

Dragline Speeds Flow of Sand and Gravel for Virginia Firm

This Marion dragline equipped with 4½ yard bucket helps a Virginia firm produce a steady flow of sand and gravel to supply its many outlets in the Middle Atlantic area.

The 111-M teams up with a floating plant and barges to chew away on the company's vast reserves in an efficient operation.

The 111-M is ideally suited to this assignment. The 4½ yard bucket and fast cycle time keep the processing plant hopper full. Its 80-foot boom keeps the machine safely away from the bank edge. Diesel mobility plus electric swing on the 111-M mean the elimination of friction swing clutch heat problems.

In dragline service, booms are available to 100 feet, buckets to 5 cubic yards. With any front end combination, the 111-M is a real producer. The 111-M diesel with electric swing does many types of big jobs well, and offers significant operating advantages. Let your nearest Marion Distributor tell you more about this outstanding Marion and the jobs it is doing.

MACHINE	Shovel Capacity	AVAILABLE AS . . .			
		Hoe	Crawler Crane	Truck Crane	Special Crane
35-M	¾	Yes	Yes	Yes	—
43-M	1	Yes	Yes	Yes	—
362	1½	Yes	Yes	—	Yes
87-M	—	—	Yes	—	Yes
93-M	2½	Yes	Yes	—	Yes
101-M	3	—	Yes	—	—
111-M	4	—	Yes	—	—

MARION **POWER SHOVEL COMPANY**
A Division of Universal Marion Corporation
Marion, Ohio

SEND ME information about **MARION** ..... yard shovels, ... yard hoes and ..... ton cranes (☐ crawler mounted ☐ truck mounted). ☐ Have a salesman call.

NAME ..... TITLE .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

NEW MACHINERY

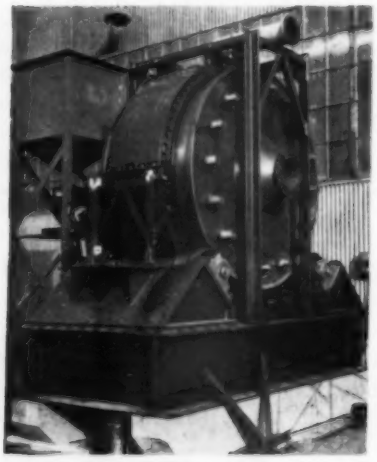
New rear dump squats for low loading

SPECIALLY DESIGNED FOR UNDERground operation and other jobs where clearance and maneuverability are important, a new low silhouette version of the 11-ton Model D Tournapull Rear Dump has been built. The unit's height is only 8 ft. 11 in. while hauling, and 11 ft. 8½ in. in dump position.

In addition to reduction in overall height, the new "Lo Dump" design incorporates a unique squat feature which permits lowering of the dump bowl to provide a loading height of only 65 in.—low enough to accommodate loading from even the relatively small tractor-mounted front end loaders. Raising and lowering of the bowl is accomplished by an electric motor. To protect the system and prevent cable breakage, limit switches have been synchronized with the lock bar action to automatically stop the motor at travel position as well as when the bowl reaches maximum low level. In addition, a standard limit switch arrangement cuts power when the bowl is raised to the extreme dump angle. *LeTourneau-Westinghouse Co., Department 085, Peoria, Ill.*

Enter 100 on Reader Card

Unit disintegrates material to predetermined size



MATERIALS ARE DISINTEGRATED to a predetermined mesh-sized product in the D'Ore Mills, Inc., "Extrapolation Unit," which has been compared to a precision machine tool in the controlled grinding of millable materials. It is equally efficient for wet or dry grinding. Self disintegration of the material is developed by cushioning the incoming raw feed between the free moving grinding roll and the cylindrical mill drum. The attrited change in directional nipping action takes the material apart at the crystal inner faces and fracture planes or the area between particles of mineral fraction.

D'Ore grinding mill units (fabricated by Consolidated Western Steel Div., U. S. Steel Corp.) are designed and built to grind any millable material for any purpose at mesh-sized settings from 3/16 in. to minus 100 mesh and in throughput capacities from one ton or less per hour to 100 tph.

In portland cement production, the end crusher product can be passed through the mill, reducing it to .093 in., 8 mesh and finer as feed to existing tube and ball mill units. It is applicable to raw materials and clinker. Preliminary tests on clinker and limestone are said to have shown that 85.1 percent of the product is recovered by gravity discharge flow from mill, 12.4 percent is collected as fines in cyclone, and 2.5 percent is collected in bag as air borne dust. No heat is produced in the grinding, and there is no loss of material from initial feed. *D'Ore Mills, Inc., P. O. Box 39774, Griffith Station, Los Angeles 33, Calif.*

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Crane-excavator

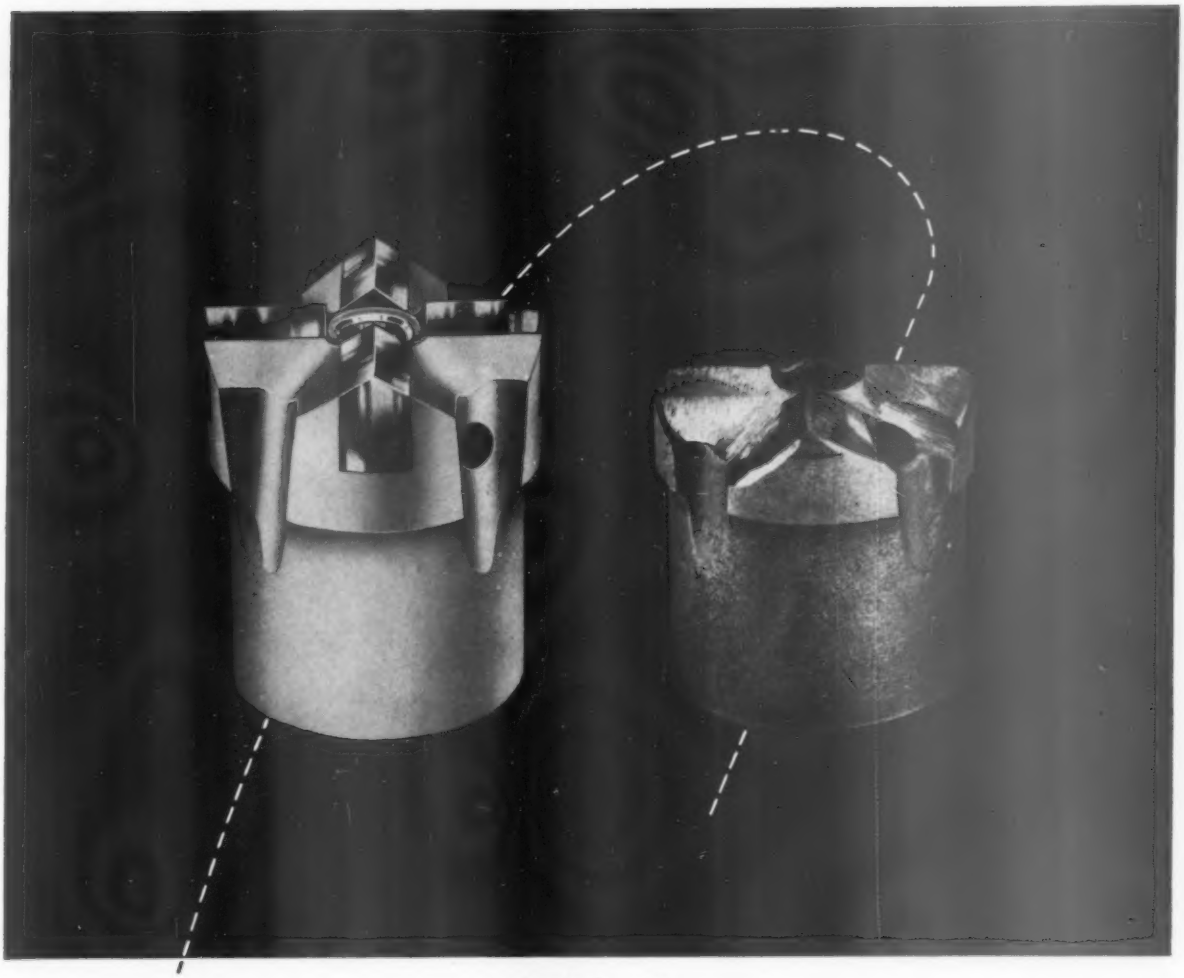
TORQUE CONVERTER DRIVE and single main shaft type construction are among the standard features of the new HECO line of motor crane-excavators. Available in 8½ and 10½-ton sizes, the units have a drag or hoist single line pull of 14,000 lb. and are designed for use with ⅜ or ½-cu. yd. bucket capacities. Under normal operating conditions, these units handle 100 to 110 cu. yd. per hour.

The single main shaft construction includes fully interchangeable clutches and brakes. The shaft is of heavy duty alloy steel with antifriction bearings throughout. Other standard features are oversized brakes, fully enclosed roller chain drive, box type pin-connected boom with open-throat top section for fast reeving of hoist line, twin boom point sheaves and fully rotating base. Power is by heavy-duty gasoline or diesel engine rated 55 hp. at 1,800 rpm. The units can be converted quickly from shovel to dragline or clamshell operation. *Hardwicke-Etter Co., 301 E. Houston St., Sherman, Texas.*

Enter 102 on Reader Card

(Continued on page 192)

Marion and the jobs it is doing.



THIS JOY BIT DRILLED *46% Farther*... STILL MORE TO GO

YOU'LL FIND YOUR BIT SIZE IN THIS CHART

SHOULDER DRIVE	BOTTOM DRIVE	TAPER SOCKET
1½″		1¼″
1⅝″		1⅜″
1¾″		1½″
1⅞″		1⅝″
2″		
2⅛″	2½″	Note: Shaded areas are X-Type, others are Cross Type
2¼″	2¾″	
2⅜″	3″	
2½″	3¼″	
2¾″	3½″	
3″	4″	
3½″	4½″	
4″	5″	
4½″	5½″	
	6″	

WRITE FOR FREE BULLETIN 172-27

Drilling Rock with a scleroscope hardness of 90-100 takes a lot out of most carbide bits . . . on this job, other bits were averaging 532 feet. Our illustration shows a Joy bit before and after drilling almost 800 feet in this formation. The average for Joy bits on the entire job was 781 feet.

Here's why: OFFSET WINGS allow drag-free rotation, faster removal of cuttings, easy reconditioning . . . DEEP SLOTTED CHIP WAYS allow cuttings to escape; bit does not regrind its own cuttings . . . INSERT STAYS IN because of new brazing method . . . SPECIAL ALLOY STEEL BODIES heat treated for shock resistance and high fatigue life . . . PRECISION MILLED THREADS instead of tapped threads.

These are the reasons why Joy tungsten carbide bits give extra footage . . . and only Joy bits have all these features. Let your Joy representative prove it to you. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WSW C 6595-172

JOY ... EQUIPMENT FOR MINING ... QUARRYING ... CONSTRUCTION

Portable Air Compressors

Wagon Drills

Drilling Bits

Hand-Held Rock Drills

Enter 1044 on Reader Card

NEW MACHINERY

(Continued from page 190)

Drilling machine

A NEW COMBINATION ROTARY and "down-the-hole" drilling machine is the truck-mounted Model T-750. In rotary drilling, the T-750 can exert almost 40,000 lb. on the bit. Infinitely variable rotation provides the right speed for the material being drilled.

In "down-the-hole" drilling, controls enable the operator to apply the right amount of down pressure and rotation speed for maximum penetration by the hammer and bits.

The drill carries exclusive Reich features including original top-drive; heavy duty jacks and semi-automatic stem handling. It has a minimum of control levers placed conveniently at the operator's station. *Reich Brothers Mfg. Co., 1439 Ash St., Terre Haute, Ind.*

Enter 112 on Reader Card

Side dumping bucket

A SIDE DUMPING BUCKET ATTACHMENT for the Caterpillar No. 933 (Series E) Traxcavator has been introduced. Prime advantages of this attachment are in allowing the Traxcavator to perform in-line loading, eliminating the need for constant turning in order to dig and load.

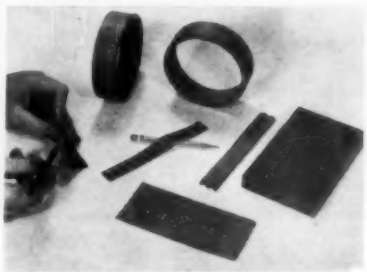
Side dumping is accomplished by the use of a hydraulic cylinder, mounted on the bucket carriage. The bucket is hinged to the carriage and is locked in place when in the conventional digging position. When side dumping is desired, the operator actuates the hydraulic cylinder which unlocks the bucket and swings it into a 64 deg. side dumping angle to the left only.

A third hydraulic valve, easily installed in the machine's hydraulic system, controls the dumping cylinder.

The side dumping end of the 1⅛-cu. yd. bucket is ramped at a sufficiently steep angle to dump sticky material. The bucket is also wider than that of the standard Traxcavator. By extending the dumping end approximately 18 in., increased side-casting distance is obtained. Material can be cast into the center of an 8-ft. truck bed. *Caterpillar Tractor Co., Peoria, Illinois.*

Enter 113 on Reader Card

Hard surfacing metal

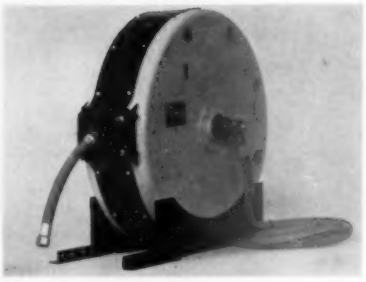


KENPLATE, AN ADAPTATION of Kennametal, consists of small hexagonal plates of cemented tungsten carbide assembled in a continuous pattern on an adhesive glass fiber backing to provide flexible sheets or strips for application on flat or curved surfaces. The adhesive backing holds the small plates in position while they are being bonded by epoxy adhesives, silver solder, or conventional brazing materials.

Two sizes of hexagons, each in three thicknesses, are now being made. They are .425 in. and .210 in. across the flats. Thicknesses are .04, 1/16, and ⅛ in. for .210-in. plates, and 1/16, ⅛, and ¼ in. for .425-in. plates.

Kenplate is supplied in strips 6 in. and 12 in. long, and in widths from .65 to 5.95 in. Typical applications of Kenplate are wear plates for mills, liners for ball mills, chute liners for abrasive materials, machine tool ways, banding joints on well drills, and mold liners for abrasive materials. *Kennametal, Inc., Latrobe, Pa.*

Enter 114 on Reader Card



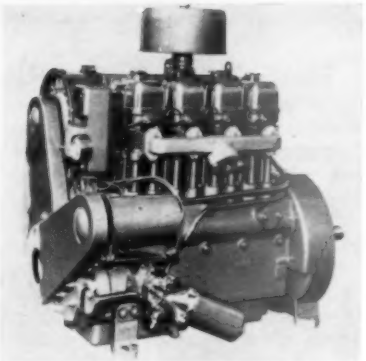
Industrial reel

LATEST ADDITION to the Weldreel line of industrial hose and cable reels is Model A-2 with a capacity of 50 ft. of ½ in. ID. single hose. Designed for use with compressed air, industrial gases, liquids and chemicals, the unit features the universal type mounting bracket which permits installation on wall, floor, ceiling or mobile plant equipment.

Heavy-duty clock-type spring provides automatic retraction into a metal housing when the hose is not in use. Teflon seals assure leakproof operation at normal operating pressures. Hose is locked at any desired length by a pawl and is released by means of a slight tug on the hose. *United Specialties, Inc., Main and Mosby Sts., El Dorado, Ark.*

Enter 115 on Reader Card

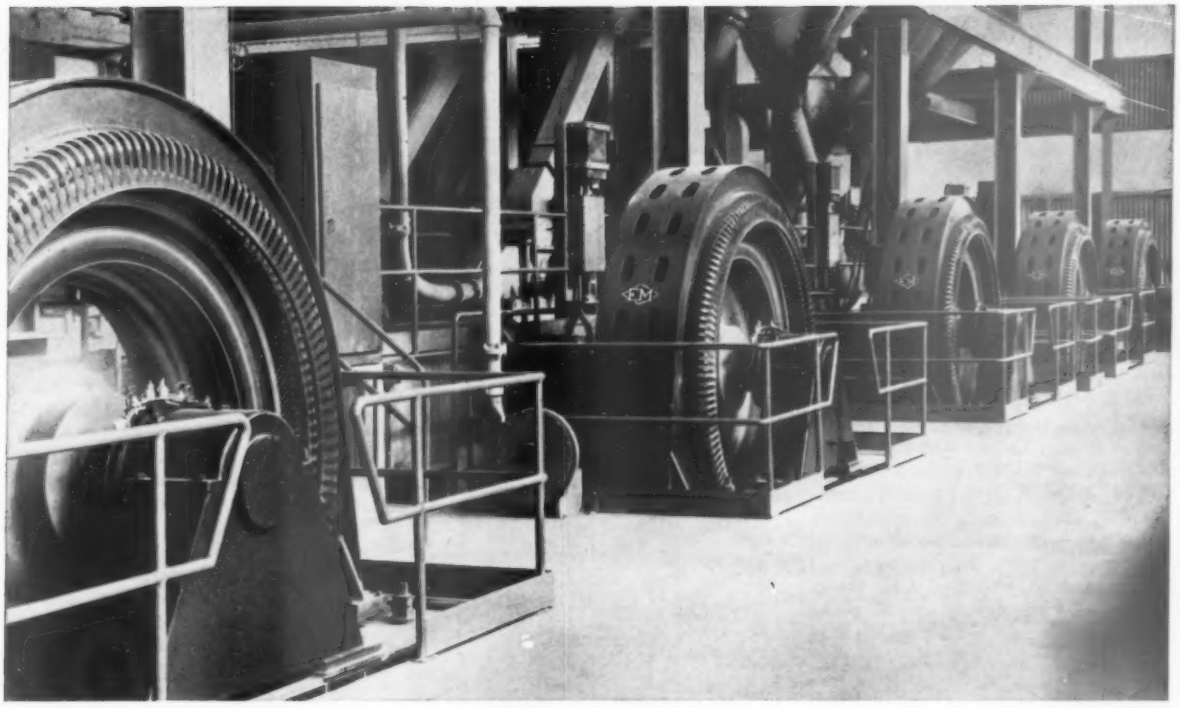
Lightweight diesel



THE FOUR-CYLINDER air-cooled high-speed diesel engine, above, is one of four new lightweight diesel engines being introduced to the American market. Produced by Petters Ltd., Staines, England, the new PC series includes one, two, three and four-cylinder models ranging in weight from 243 lb. to 503 lb. Horsepower output ranges from 6.25 for the PC-1 to 25 for the PC-4. All Petters PC engines operate at a constant speed of 3,000 rpm. American distributors: *Brush ABOE, Inc., 60-07 39th Ave., Woodside, N.Y.*

Enter 116 on Reader Card

(Continued on page 194)



Notable for advancements in safety and simplicity is the new grinding mill department of Dragon Cement Company, Northampton, Pa. An excellent example of compactness, it is designed to be safely operated by *four men*. Rated capacity will be 2,400,000 bbl. of cement annually.

How Dragon Cement Company drives mills efficiently and safely in new 4-man grinding mill department

E-M "INCHER" CONTROL

This E-M-developed control provides quick, safe spotting of grinding mills. It turns mills literally inch-by-inch into desired position, all at the touch of a button. One E-M "Incher" Control can serve several motors, saving time and greatly increasing safety.

● Helping to achieve labor conservation, simplified maintenance, and safety in this new raw and finish grinding mill are five rugged E-M Synchronous Motors rated 1000 hp, 180 rpm, 2300 volts, "unity" power factor. Specifically, here's how these E-M Motors contribute to new standards of economical plant operation:

1. **HIGH EFFICIENCY** conversion of electric power to mechanical power, resulting in minimum electric power cost for operation of mills.
2. **POWER FACTOR CORRECTION** with "unity" power factor helps keep overall plant power factor high, further reducing power costs.
3. **DIRECT CONNECTION** of Motors to mills, thru rigid couplings for simplicity and minimum installation space.
4. **HEAVY-DUTY MILL-TYPE CONSTRUCTION**, including extra-heavy motor frame, high thermal capacity cage windings, dust resistant coil finish, and cool running sleeve-type bearings.

When you combine such motor features and top performance with E-M Hi-Fuse (high voltage, high interrupting capacity) Controls, you get the ultimate in protection as well. Complete safety for personnel and equipment, plus *extra safeguards* against short circuits and abnormal operating conditions. Your nearest E-M sales engineer can give you facts and data. Write the factory for E-M Publication No. 175 on large synchronous motors.

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

Specialists in making motors do **EXACTLY WHAT YOU WANT THEM TO**

E-M

1200-TPA-2183

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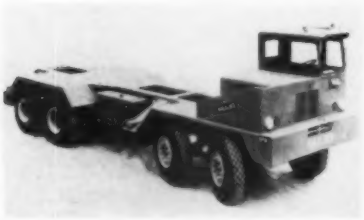
NEW MACHINERY

(Continued from page 192)



Truck crane carrier

A NEW 35-TON TRUCK CRANE CARRIER is available in two models: the T-84-F (8 x 4 drive) and T-64-F (6 x 4 drive). Design features include the patented Maxibrake attachment.

The carriers have welded high-strength, alloy steel frames, removable outriggers with slide-type extensions both rear and midship, air assist on clutch, power steering, tow hooks front and rear, and removable panel inside cab for accessibility to left side of engine. The brake attachments provide an automatic spring-actuated, mechanical application of brakes when air supply is depleted. The driver can set the brakes for parking or emergencies with the attachments by releasing the air through cab controls.

Trucks are available with either the Waukesha Model 145 GKB, six-cylinder 207-hp. gasoline engine or Cummins NHBI-600, six-cylinder diesel engine.

Brief specifications: total weight, 39,300 lb.; wheel base (center to center of tandems), 16 ft. 6 in.; overall length, 28 ft. 3 in.; overall width, 10 ft. 3 in. *The Maxi Corp., P. O. Terminal Box 3129, Los Angeles 54, Calif.*

Enter 103 on Reader Card

Multiwall paper bag

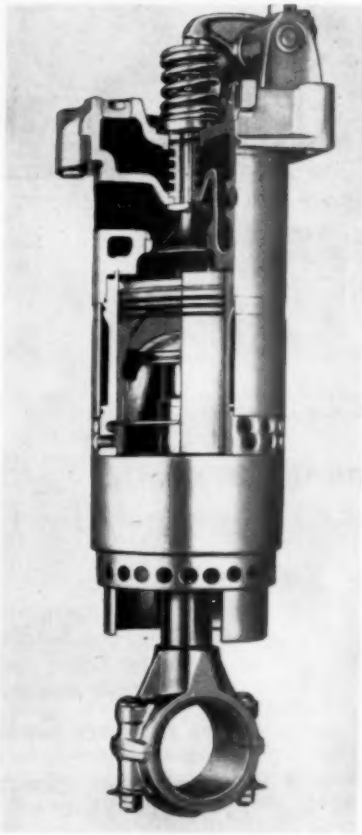
A NEW TYPE of multiwall paper bag has been developed by Owens-Illinois Glass Co. in cooperation with Wyandotte Chemicals Corp. The main feature of the bag is a pasted valve reducing insert that permits standardization of pallet patterns regardless of the density of the packaged product. The bag further lends itself to high-stacking, making economical use of space.

The valve reducing insert makes it possible for the manufacturer to make a bag of standard length and width, but with a thickness when filled that may range anywhere from 3½ to 6½ in. The capacity, in other words, is varied to suit the properties of whatever is put in it. Customers may specify the size valve reducing insert needed to fit their packing machinery filling spouts. The insert is designed and applied to the bag.

Being compact, the new bags are said to be easier to handle. They are three-ply, using two 40 basis weight sheets and one 50 basis weight sheet of natural Kraft paper. *Owens-Illinois Glass Co., Multiwall Bag Division, Toledo, Ohio.*

Enter 104 on Reader Card

Rod and piston

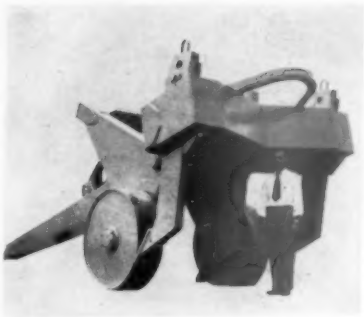


A "MUSHROOM" ROD AND PISTON has been introduced by Harnischfeger for its line of two-cycle P&H diesel engines. The design utilizes a semi or half ball and socket coupling in place of the conventional wrist pin arrangement. Bearing area is increased up to 2½ times, providing smoother operation and longer bearing life.

The new hollow mushroom rod carries an oil supply from the crankcase to the network of oil grooves in the top side of the rod bearing. Both oil flow and oil pressure to the bearing is increased.

The piston itself rotates freely in the cylinder, maintaining roundness of both piston and cylinder wall, and keeping ring lands free. *Diesel Div., Harnischfeger Corp., Crystal Lake, Ill.*

Enter 105 on Reader Card



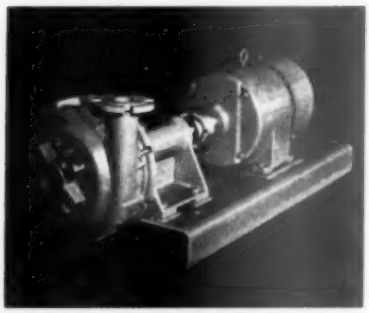
Wheel-type ripper

A 25,000-LB. WHEEL-TYPE drawn ripper has been developed to withstand severe job conditions. The Southwest Extra Heavy RXH-3 has an overall length of 25 ft., width of 10 ft. 8 in. and height of 8 ft. 10 in. It has been designed particularly for use with the largest of tractors in the heaviest of ripping work. It is designed for three depths of penetration, 36, 42 and 48 in. A special center shank can be furnished to give penetration of 60 in.

Through a predetermined and set angle of the ripper shanks, penetration is quick and positive. Shanks are of special alloy heat treated steel forging, and hard-faced points are replaceable. *Southwest Welding & Manufacturing Co., 3201 W. Mission Road, Alhambra, Calif.*

Enter 106 on Reader Card

High speed slurry pump



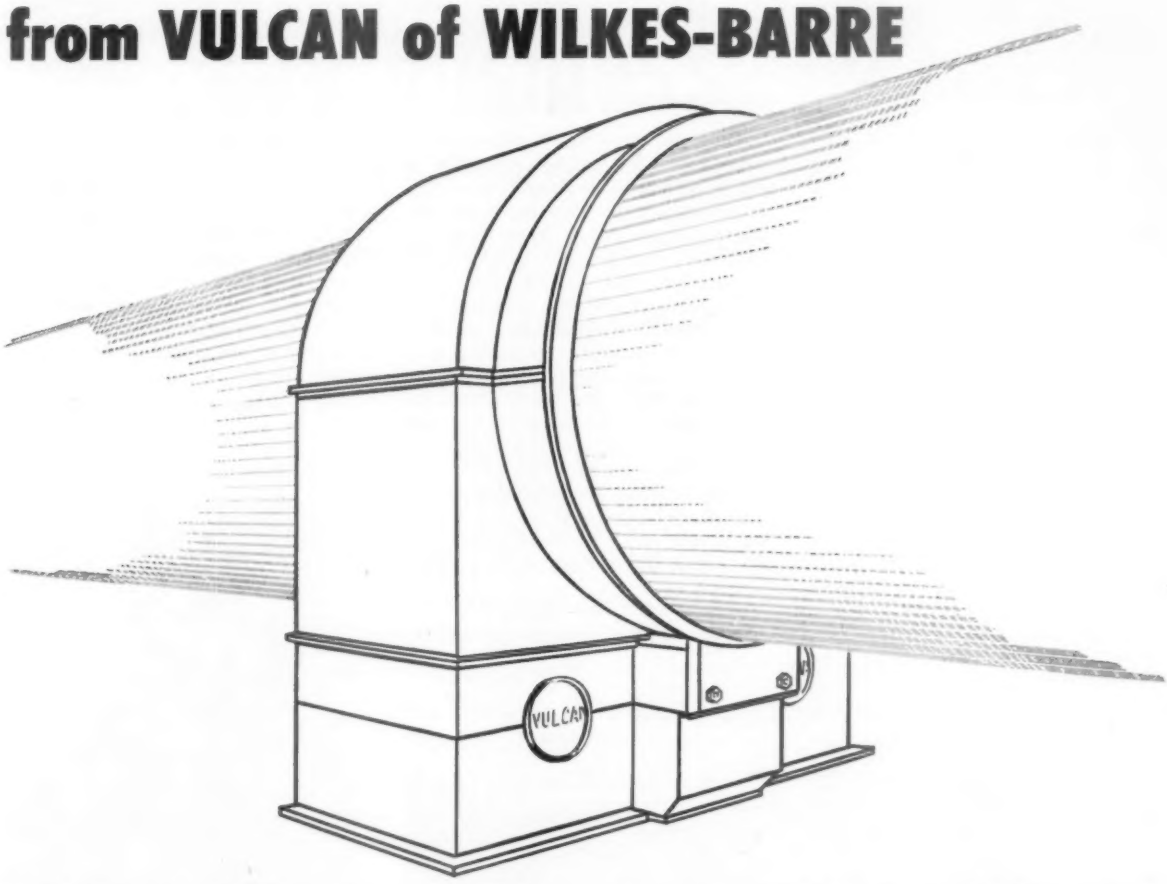
A NEW MEDIUM-RANGE, high speed slurry pump, known as the Type BA, has been introduced for handling suspensions of sand, crystals, silt, sludge and lime slurries.

Built in 1, 1½, 2, 3 and 4 in. sizes, the BA pump is available in cast iron, Ni-hard or stainless steel. Easy to dismantle and reassemble, the pump features a renewable suction liner and semi-open impeller. It combines simplicity of design with structural strength and modern principles of hydraulic engineering. *Morris Machine Works, Baldwinsville, N.Y.*

Enter 107 on Reader Card

(Continued on page 196)

THIS IS THE "NEW LOOK" IN ROTARY KILNS (FOR ALL APPLICATIONS) from VULCAN of WILKES-BARRE



This is the packaged power unit of VULCAN's new concept in Rotary Kiln Design. The rollers that support the kiln, the girth gear, and gear train that power it, and a positive thrust mechanism have been integrated in a sealed enclosure.

This integration not only saves one concrete foundation pier but enables VULCAN to gear link these integrated units for positive synchronous rotation. This is an entirely new concept in Rotary Kiln design that will: simplify your foundation plan; avoid frictional wear; reduce torque and power load; save maintenance costs; occasion less down time . . . and give you a trouble-free mechanical unit for inclusion in any plan of automation for any industrial process in which a Rotary Kiln is employed.

This big forward step in Kiln design should be right in step with your expansion or remodeling program.

Write today for full particulars. Estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation. VULCAN brings you 107 years of experience in Kiln design and manufacture.

VULCAN IRON WORKS

WILKES-BARRE PENNSYLVANIA

"THE OLDEST NAME IN ROTARY KILNS"

ESTABLISHED 1849 • CABLE ADDRESS: VULWORKS

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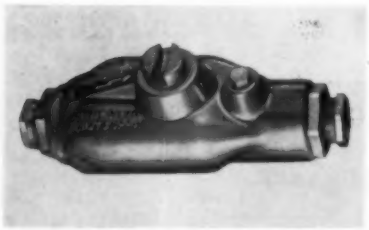
NEW MACHINERY

(Continued from page 194)

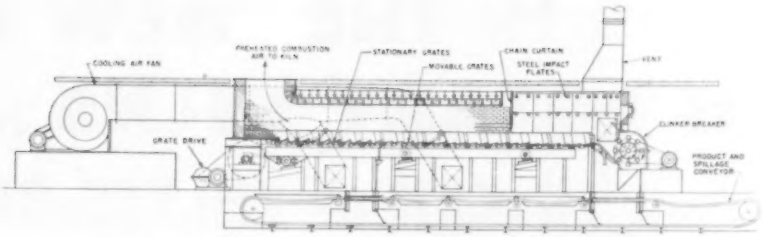


Automatic line oiler

LACK OF OIL, the most prevalent cause of air tool damage, is eliminated by the LO380, a new automatic line oiler which shuts off the air supply when the oil is used up. The unit is lightweight (9 lb.), easily adjusted, and refillable while in use. Positive type oil pickup feeds oil the instant drilling starts.

Differential pressures operate the oiler; air is routed through it to create a pressure on the inside of an oil resistant bellows which forces a regulated amount of oil through a porting. Oil is injected into the air stream at the outlet end. Top capacity is 300 cfm. *Le Roi Division, Westinghouse Air Brake Co., Milwaukee, 1, Wis.*

Enter 108 on Reader Card



Horizontal-grate cooler is time, space-saver

GREATER COOLING EFFICIENCY IS combined with space savings in a newly developed horizontal-grate cooler. Designed to cool materials discharged from rotary kilns, sintering machines, roasters and various types of furnaces, this new unit can be used for materials ranging in size from fine foundry sand to clinkers and pellets.

As in an inclined-grate cooler, movable and stationary grates alternate. But with the grates on a horizontal plane, material is pushed by the movable grates up and over the noses of the stationary ones. Resistance of the material against this movement causes immediate horizontal spread across the cooler bed, thereby permitting use of wider and shorter coolers where needed.

The cooler also features a new "three-component control system." In this system, the temperature of the air used for the combustion of fuel in the kiln or furnace determines the amount of air admitted under the grate compartment at the hot end of the cooler. Under-grate pressure, in turn, determines the speed of the grates. At the same time, hood kiln or furnace draft determines the amount of air vented to the atmosphere. *Fuller Co., Catasauqua, Pa.*

Enter 110 on Reader Card

Long boom arrangement furnished tractor-loader

DUMPING CLEARANCES of 13 ft. 10 in. under the hinge pin and 11 ft. 4 in. under the bucket cutting edge are obtainable on the 2 cu. yd. TL-20D Tractoloader through the use of a long boom arrangement. The TL-20D has a minimum reach of 3 ft. 3 in. at maximum height, and at the 9 ft. dumping clearance the minimum reach is 4 ft. 6 in. It is recommended for use in materials weighing up to 2,700 lb. per cu. yd. Construction features are those of the standard model: single lever speed and direction control of the power shift transmission, torque converter, planetary axles pin-connected to the frame, power steering, power brakes and 24-v. electrical system. *Tractomotive Corp., Deerfield, Ill.*

Enter 109 on Reader Card

Aluminum alloy rock body

THE HEIL CO. has just completed at its Milwaukee factory the first of a series of very large rock-handling truck bodies fabricated from special aluminum alloy plate and extruded sections. These truck bodies are unusual since they are made entirely from aluminum. Other unusual features are: all-welded construction, great size (approximately 36 cu. yd. heaped), all interior corners rounded and heated floor construction.

These bodies are being mounted on special off-highway trucks, with Heil heavy-duty telescopic hoists.

It is expected that they will offer advantages in operation through increasing the amount of payload which can be carried, reducing tire wear and gasoline consumption, and by increasing speed to give a greater number of round trips each day. *The Heil Co., Milwaukee 1, Wis.*

Enter 111 on Reader Card

(Continued on page 198)

"MARCY kept us in business"

says George Wagner, Superintendent

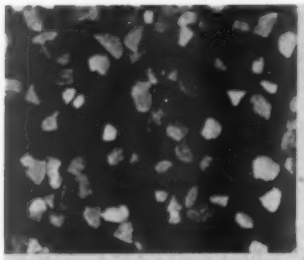
DENVER MORTAR AND MATERIALS COMPANY

now gets $2.00 a yard out of waste gravel

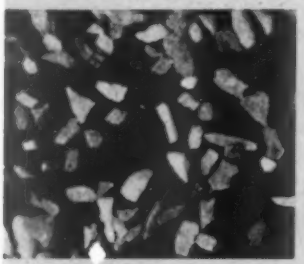
About 6 years ago the company management thought they would have to go out of business. The sand deposit was running over 50% pea gravel for which there was a very limited market ...and they were lucky to get 25c a yard for it. This condition also presented a serious stockpiling problem.

Then they bought a 3′ x 6′ Marcy Rod Mill. Screening at 6 mesh results in approximately equal quantities of plus and minus 6-mesh products. One pass through the rod mill reduces the pea gravel to the desired size for plaster and masonry sand.

George Wagner, Superintendent, says: "The Marcy Mill makes a better product, cleaner and sharper than the natural sand. Now we get $2.00 a yard, wholesale, instead of nothing, out of half of our pit material. The Marcy mill kept us in business."



MARCY CPD MILL PRODUCT



CRUSHER PRODUCT

COMPARISON OF MARCY MILL AND CRUSHER PRODUCTS

Identical rock samples were put through a crusher and a Marcy CPD Mill. The resulting products, screened to −10 +14 mesh, are shown above. Note the elongated shape and sharp, weak edges of the crushed product compared with the uniformly cubical Marcy Mill product.

For complete information on the many advantages of grinding sand with Marcy Rod Mills—

The Mine & Smelter Supply Co.

Denver • Salt Lake City • El Paso • New York

Representatives in Foreign Countries

WRITE FOR CATALOG

SPECIALISTS IN GRINDING FOR FORTY YEARS

Enter 1099 on Reader Card

NEW MACHINERY

(Continued from page 196)

Stationary magnet clutches

ELECTRO-MAGNETIC CLUTCHES for dry and wet applications are said to offer a new concept in stationary magnet clutches. Easy installation, low maintenance, fast acting, and simple positive adjustment are provided. Oversized bearings are factory sealed, requiring no lubrication under normal conditions. Friction linings are standard parts. When the need for adjustment is apparent, three wear adjusting screws may be turned to compensate for lining wear. These same adjusting screws also provide a means for mechanically engaging the clutch in the event of power failure.

The "GS" clutch for dry applications, and "GSW" clutch for wet applications give smooth engagement and disengagement. Both can be actuated remote or direct with automatic or manual controls such as push buttons, limit switches, electric eyes, or any other switching device. Plug-in electrical connections end the need for slip rings or brushes.

These clutches can be adapted to modern machine tools and are available in sizes from 4 to 9 in. diam. *Stearns Electric Corp., 120 N. Broadway, Milwaukee 2, Wis.*

Enter 117 on Reader Card

Power drill for hard formations

AN OIL WELL DRILLING "engine" which operates at the bottom of the hole is expected to double or quadruple drilling speeds through the hardest rock. Soon to be available to all industry, in effect it solves the problem of adding a percussion hammer to the end of the drill string.

The tool is expected to provide savings in money, time and maintenance as a result of faster penetration. It also promises to help solve the problem of maintaining straight holes in hard rock or slanting formations.

The tool consists of a reciprocating piston and cylinder arrangement for delivering percussion blows. It is powered by the drilling mud which must be kept circulating through the hole to carry off the drilled-up rock.

The device is encased in a cylinder approximately 19 ft. long which hangs at the end of the drill string, with a conventional roller bit fastened directly below. As the drilling mud circulates through the mechanism, it drives a 200-lb. hammer delivering 600 or more strokes per minute on the attached bit.

Meanwhile the drill is slowly rotated under a load which may be from 6,000 to 40,000 lb. depending on downhole conditions. The bit points are thus successively positioned and driven against the hole bottom in a manner similar to that in which star drills are turned to make holes in masonry. Hanging almost like a plumb bob at the end of the string, the percussion hammer chops a vertical passage downward despite the hardness or slant of the formation. *Gulf Oil Corp., Pittsburgh 30, Pa.*

Enter 118 on Reader Card

LPG engines

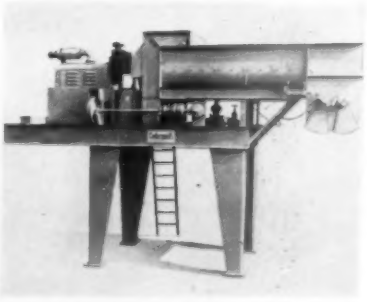
AVAILABILITY OF FACTORY-INSTALLED LPG engines in cab-forward trucks has been announced by the motor truck division of the International Harvester Co.

Four LPG engines are available optionally in four and six-wheel A-Line conventional and cab-forward models. These are the 132-hp. Black Diamond 240, the 143-hp. BD-264, the 138-hp. BD-282, and the 155-hp. BD-308.

Truck users can benefit by combining the short over-all length and greater maneuverability of four and six-wheel cab-forward models with advantages of using LPG fuel, it was pointed out. *International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.*

Enter 120 on Reader Card

Stabilized base mixer



A STABILIZED BASE MIXER that will provide from 300 to 500 tph. of aggregate thoroughly mixed with water, and calcium chloride when desired, has been announced. Model 2 twin shaft stabilized base mixer consists of a twin shaft mixer, discharge hopper, self-priming pump and meter, all mounted on a steel frame and supported by steel legs. It includes drives, speed reduction unit and controls. Front and rear running gear are available to support the frame without legs when moving. *Iowa Manufacturing Co., Cedar Rapids, Iowa.*

Enter 121 on Reader Card

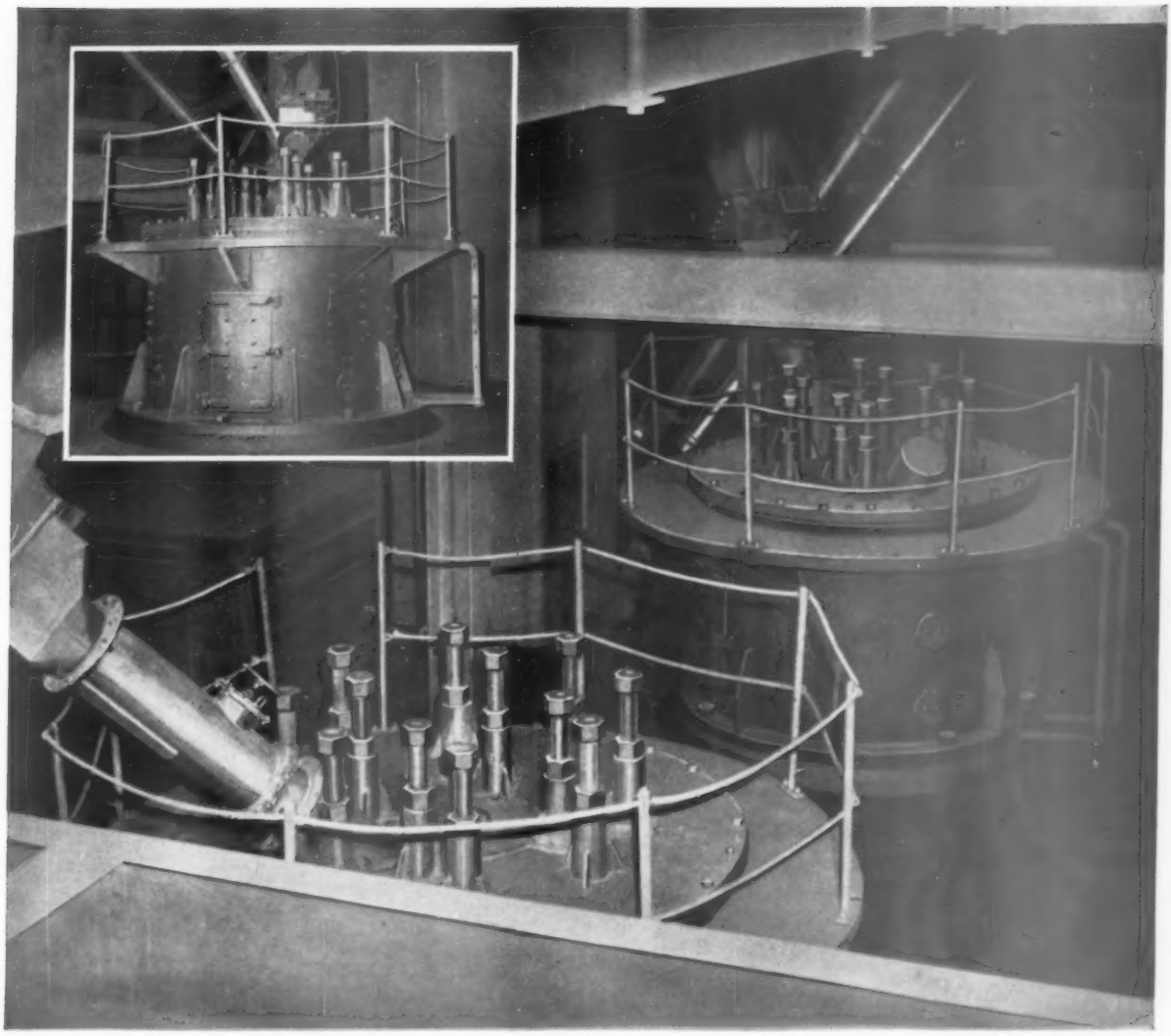
(Continued on page 200)

Portable screening plants for on-spot production

TWO NEW PORTABLE AGGREGATE SCREENING plants, Models 366 and 488, consist of single-deck buzzer screens and reciprocating plate feeders permanently mounted on a lattice frame conveyor installed on a hydraulic cradle truck. Model 366 has a 3x6-ft. screen, and Model 488, a 4x8-ft. screen.

On both models, the screen is pivot mounted on the delivery end of the conveyor. Hydraulic raising and lowering of the conveyor simplifies set-up and operation. *Pioneer Engineering, Minneapolis 14, Minn.*

Enter 119 on Reader Card



CLOSED-CIRCUIT GRINDING AT LOW COST

with B&W Type B Pulverizers

At Alpha Portland Cement Company's plant in Cementon, N.Y., two B&W Type B Pulverizers grind raw materials in a B&W Closed-Circuit System. One pulverizer has been in service for about 20 years and the other more than one year. Total capacity is 90 to 100 tons per hour and grindability is about 55 Hardgrove.

Alpha and other users have discovered that long life is built into the grinding elements of B&W Pulverizers. This means efficient, low-cost grinding.

Many long service records prove that B&W Type B Pulverizers require less power, low maintenance and minimum space . . . offer, high fineness, easy access and long life.

For raw grinding economy call on B&W. Write, The Babcock & Wilcox Company, Boiler Division, Process Equipment Department, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

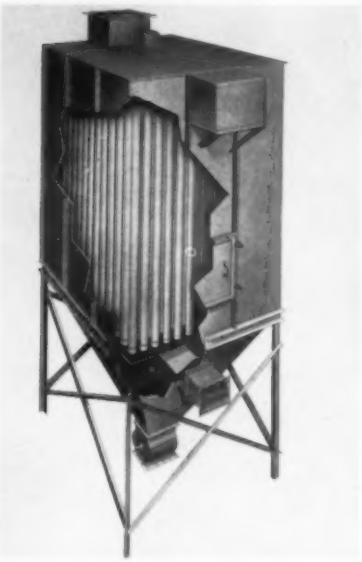
C-218

Enter 1083 on Reader Card

NEW MACHINERY

(Continued from page 198)

Glass-bag filter



AT THE 26TH EXPOSITION of Chemical Industries, Dracco Corp. introduced a new glass-bag filter for collecting hot, corrosive industrial dusts and fumes. This device will find many applications in cement and chemical plants.

The use of glass cloth extends cloth filtration into new areas of application. It is able to operate at temperatures to 600 deg. F. and resists deterioration from all substances except fluorine and hydrofluoric acid. The filter bags are single-hung tubular type, made of fiber glass cloth which has been treated for protection against fracture. Adequate spacing between adjacent bags prevents bag contact during shaking. Bag suspension and shaking mechanisms were redesigned to assure correct bag hanging tension, minimum wearing action and gentle, effective shaking.

Air-cleaning action is much the same as in other conventional filter designs. Dust and fume-laden air is drawn into the filter hopper and upward into the bags. Only clean air, 99½ to 100 percent free from visible dust, passes through. Periodic shaking loosens the particles which fall to the bottom of the hopper to be discharged. *Dracco Corp., 4063 E. 116th St., Cleveland 5, Ohio.*

Enter 122 on Reader Card

Precipitator programmer

A NEW STATIC PROGRAMMER which automatically adjusts electrostatic precipitator voltage for maximum cleaning of smokestack discharges has been announced. It has no moving parts and and can be applied to existing precipitators as well as to new installations. Built-in flexibility of the programmer makes it adaptable to a variety of precipitator control circuits. It is designed for simplified installation and reduced maintenance. Potted transistors, rectifiers, and other static components contribute to long operating life.

It is equipped with a spark frequency adjustment to preset the allowable number of sparks per minute; an incremental voltage adjustment to regulate the magnitude of voltage increase or decrease in a given period of time; and a maximum current-limiting adjustment to help protect the power supply from exceeding its rating and to establish the desired maximum operating level. *General Electric Co., Schenectady 5, N.Y.*

Enter 124 on Reader Card

Electronic metal detector

AUTOMATIC BALANCE CONTROL is an exclusive feature of the new "Twin Loop" electronic metal detector. This feature assures stability of the electronic circuit and eliminates need for constant observation and adjustment.

The metal detector can be installed on any conveyor system handling nonmagnetic materials. The sensitive inspection loops detect tiny metal particles at speeds from 30 to 600 fpm. Control circuits can be set to trigger a warning light or other signal, or to actuate a reject mechanism that will divert contaminated products.

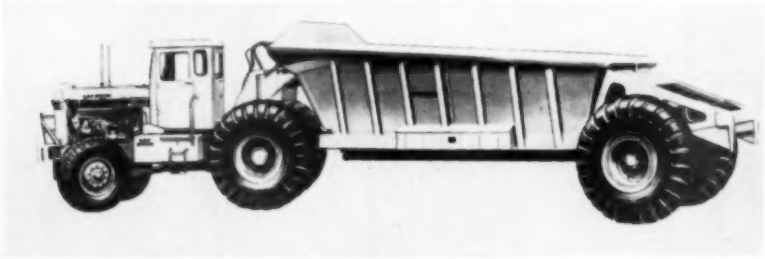
The control cabinet weighs 75 lb., and measures 19 x 25 x 11 in., with main fuse, controls, manual reset button and indicator lights on front panel. A locking door prevents tampering.

Twin Loop inspection coils are available in standard 48-in. circular or 10 x 33-in. rectangular models. Special sizes and shapes can be designed for any installation requirements. *Stearns Magnetic Products, 635 S. 28th St., Milwaukee 46, Wis.*

Enter 125 on Reader Card

END

Exclusive design features in new bottom dump



A NEW KIND OF BOTTOM DUMP trailer now in production is the 40-ton PW20. The unit is made of T-1 steel, the new high-strength, high-alloy steel developed by United States Steel Corp. Use of this steel increases the trailer capacity in relation to its own weight. Capacity is 80,000 lb., almost four times the trailer weight.

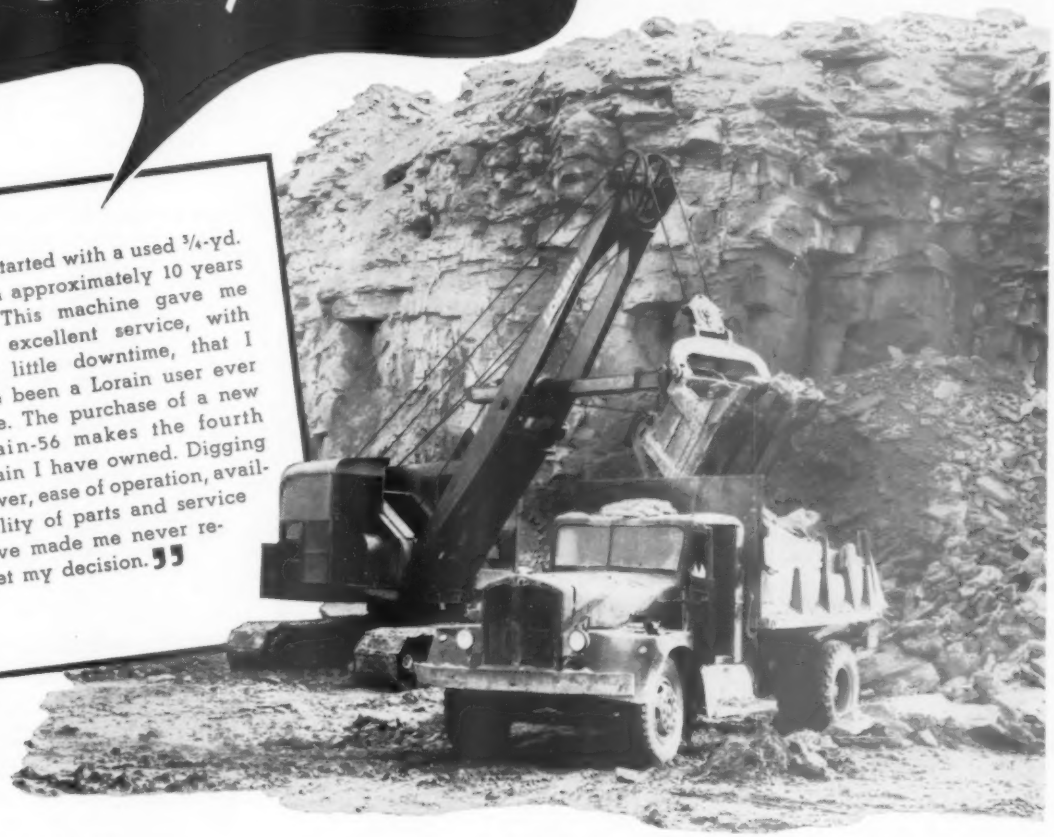
Another feature is the exclusive rear-door design. This rear door opens simultaneously with the bottom doors and permits material to flow smoothly out to the rear. Steep 18-deg. side angles and 15 ft. 10½ in. x 6 ft. bottom doors give less funneling action during dumping and allow for handling of oversize material.

The PW20 can spread or windrow loads. An air release opens the doors instantly or under hydraulic pressure for controlled dumps. When closed, the doors are locked with a positive mechanical latch which relieves the hydraulic system of all load. Matched to the Caterpillar DW20 tractor, the PW20 has speeds up to 32.1 mph. *Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill.*

Enter 123 on Reader Card

Here's why Allan Simpson bought his 4th LORAIN–

Allan Simpson, Beaver Falls, Pa., is shown here using his 1¼-yd. Lorain-56 at the Ellwood Stone Co., Koppel, Pa., to load sandstone. Working two shifts a day, the Lorain-56 more than keeps up with crusher capacity.



"I started with a used ¾-yd. Lorain approximately 10 years ago. This machine gave me such excellent service, with very little downtime, that I have been a Lorain user ever since. The purchase of a new Lorain-56 makes the fourth Lorain I have owned. Digging power, ease of operation, availability of parts and service have made me never regret my decision."

You, too, like Allan Simpson, will never regret the purchase of a 1¼-yd. Lorain-56. Here are just a few reasons why:

"Shear Ball" Turntable Mounting

Turntable is secured to crawler and revolves easily and freely on a huge, sealed "ball bearing." There is no center pin or nut, centering gudgeon or exposed roller path . . . no turntable rollers . . . no constant adjustment, maintenance or lubrication problems.

2-Lever, "Joy-Stick" Air Controls

Fewer levers, fewer motions, faster, smoother, less effort, less fatigue, more output. By feeding "metered air" to clutches at any rate desired—the operator retains that "old-time feel" of all turntable operations.

Torque Converter Power-Take-Off

Smooth, "never-say-die" power. No stall due to any digging circumstances. Automatically adjusts torque to job demand.

Full Air Power Control of All Crawler Operations

Propelling the crawler—travel locking pawls, travel jaw clutches, crawler steering, swing lock are all easily controlled with "Air-Ease" power.

Your Thew-Lorain Distributor will be glad to show you additional reasons why the "56" is a top value buy in the 1¼-yd. class. See him now for complete details.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

Enter 1160 on Reader Card

MANUFACTURERS NEWS

Executive changes announced at Joy Mfg. Co.

W. L. Wearly

A. B. Drastrup

WILLIAM L. WEARLY has been elected president of Joy Mfg. Co., succeeding John Lawrence who resigned. Mr. Wearly has been with the company for 20 years, starting his career in the operating department of the Franklin, Pa., plant. He later became vice president in charge of sales, and for the past two years has been executive vice president.

A. B. Drastrup was appointed by the board of directors to replace Mr. Wearly as executive vice president. Mr. Drastrup has been manufacturing vice president and assistant to the president. In addition, he has worked in administration of the company's foreign subsidiaries and operations.

Robert N. Conners retires

ROBERT N. CONNERS, executive vice president of the Chase Bag Co., Chicago, Ill., retired on Dec. 31. He will continue, however, to serve as a member of the board of directors.

Mr. Conners was vice president and general sales manager before his appointment as executive vice president in 1953. He was elected to the board of directors in 1939. Previously he served as sales manager and later as manager of the Minneapolis branch, and as midwestern zone manager.

E. J. Costello promoted

WILEY MFG. CO. has announced the appointment of Edward J. Costello as vice president in charge of sales. Mr. Costello, who joined the firm in 1954, was head of the sales department.

A. Radford named director

ADMIRAL ARTHUR W. RADFORD, former chairman of the Joint Chiefs of Staff, was elected a member of the board of directors of Worthington Corp., Harrison, N.J. Admiral Radford, who was first appointed chairman of the Joint Chiefs of Staff in 1953, recently retired from the Navy after 45 years of distinguished service.

Robert G. Allen elected executive vice president

ROBERT G. ALLEN has been elected executive vice president of Bucyrus-Erie Co., Milwaukee, Wis. Mr. Allen joined the company last July as a vice president. In August, he was appointed executive assistant to the president and placed in charge of all manufacturing operations.

Mr. Allen, one of the first to be enrolled in the special executives' course at Harvard University's School of Business Administration, represented Pennsylvania's 28th district in Congress for two terms, from 1937 to 1941, serving on the foreign affairs committee. Before joining Bucyrus-Erie, Mr. Allen had served as president of Duff-Norton Mfg. Co., and as president of the Pesco Products and Wooster divisions, Borg-Warner Corp.

Thor sales appointments

WALTER B. SMITH has been named district sales manager of Thor Power Tool Co.'s Milwaukee, Wis. branch replacing Clarence B. Bergren, who was appointed manager of electric and SpeedTool sales.

In addition, the promotions of five others to posts as district sales managers were announced. They are: Harry L. Groves, Houston, Texas branch; Martin A. Bertram, Cincinnati, Ohio branch; Samuel P. Gartland, Boston, Mass. branch; Thomas J. Murphy, Buffalo, N.Y. branch; and James Q. Golden to the Atlanta, Ga. branch.

W. E. Crowther appointed personnel manager

WALTER E. CROWTHER has been appointed manager of the personnel relations department of Western Machinery Co., San Francisco, Calif., according to an announcement by Jack H. How, president. Mr. Crowther holds a B. A. in business administration from Marshall College, University of Pittsburgh, in Pennsylvania; and has spent the past 13 years in personnel work with Universal Rundle Corp. and Continental Can Co.

(Continued on page 204)

Firestones are carrying more loads per dollar!

From the St. Lawrence Seaway to the Priest Rapids Dam in the State of Washington, records prove that Firestone Rock Grip Tires with S/F—safety-fortified—Nylon outwork and outwear them all. Tough cord bodies withstand severest punishment to slash downtime losses. You cut tire costs because two great tread designs match these off-the-highway tires to *any* job. You get the *flotation and traction* you need in loose earth and wet going. You get *armored* protection for hauls over splintered shale and knife-edged rocks. Firestone Tires defy cuts and slugging impacts like no other tires made. Ask your Firestone Sales Engineer about these *tubed* or *tubeless* heavy-duty tires. Call him today at your local Firestone Dealer or Store.

ROCK GRIP WIDE BASE ROCK GRIP

Firestone

BETTER RUBBER FROM START TO FINISH

Enjoy the Voice of Firestone on ABC television every Monday evening.

Copyright 1958, The Firestone Tire & Rubber Company

Enter 1081 on Reader Card

MANUFACTURERS NEWS

(Continued from page 202)

L. W. Darling appointed general sales manager

APPOINTMENT OF L. W. Darling as general sales manager of Davey Compressor Co., Kent, Ohio has been announced. In addition to his new duties, Mr. Darling will continue as assistant vice president. A graduate of Duke University, Mr. Darling joined Davey in 1945.

C. Hennessy named to board

CARROLL A. HENNESSY has been elected a member of the board of directors of Lamson Corporation of Delaware according to an announcement by Francis D. Weeks, president. Mr. Hennessy also was elected a director of the subsidiary company, Lamson Corporation, Syracuse, N.Y.

Mr. Hennessy joined Lamson in 1931 after receiving a degree in mechanical engineering from Syracuse University. He is now vice president in charge of the industrial and commercial product divisions.

Allis-Chalmers promotions

APPOINTMENT OF C. R. Burnett as engineer in charge of pyro-processing machinery has been announced by Allis-Chalmers. Mr. Burnett had been supervisor of cement machinery sales. In his new post, Mr. Burnett succeeds E. H. Baxa, who was recently named manager of the processing machinery department.

Also announced was the appointment of J. D. Harmison as sales manager, material handling, Buda Division. Mr. Harmison was formerly parts sales manager for the tractor group.

In other appointments, C. W. Parker, Jr., has been appointed manager of the Philadelphia district succeeding A. D. Brown, who was transferred to the regional office staff. Succeeding Mr. Parker as manager of the Richmond district will be J. M. Mathews, former manager of the Charleston district. Gordon Hood, a former sales representative in the Baltimore district, will succeed Mr. Mathews.

Owens-Illinois appointees

TWO POSITIONS in the multiwall bag division of the Owens-Illinois Glass Co., Toledo, Ohio, have been filled with the appointment of T. W. Brown, Jr., as general sales manager and Philip Williams as assistant sales manager. Mr. Brown was formerly sales manager of the division's southern district, a post he had held since Sept., 1953.

Mr. Williams, who joined the company in 1956, was formerly division sales promotion manager.

New Reo sales managers

THE APPOINTMENT of Walter W. Kling as manager of the Philadelphia district sales office of Reo Div., The White Motor Co., Lansing, Mich., has been announced. Mr. Kling has been with the company for 12 years, having served as salesman and assistant to the branch manager. Currently he held the position of sales manager in the Philadelphia area.

Also announced, was the appointment of William T. Giles as district sales manager for the Cincinnati, Ohio, district sales office.

Holmes made sales engineer

TEMPLETON, KENLY & Co., Broadview, Ill., has appointed William E. Holmes as sales engineer covering the states of Wisconsin, Missouri, central and southern Illinois, northern and southern Indiana, Iowa, Kansas, western Kentucky and the southwestern section of Michigan.

J. Newsome named manager

PETTIBONE-MULLIKEN CORP., Chicago, Ill., has announced the appointment of John J. Newsome, Jr., to New York area branch manager for sales and service of its line of construction equipment. Mr. Newsome will be in charge of operations at the Paramus, New Jersey, and Amityville, Long Island branches.

Signode sales changes

SIGNODE STEEL STRAPPING CO., Chicago, Ill., recently named six new regional managers and eleven new district managers to head several newly created regions.

The new regional managers are: C. J. Da Costa, Cleveland, Ohio region; R. E. Jacobs, St. Louis, Mo. region; T. E. Noon, Boston, Mass. region; Almer Pearson, New York, N.Y. region; S. N. Salomon, Pittsburgh, Pa. region; and J. R. Williams, Chicago, Ill. region.

The newly appointed district managers are: H. E. Edwards, Milwaukee, Wis. district; R. F. Quady, Minneapolis, Minn. district; R. E. Lenhard, Indianapolis, Ind. district; S. R. Tucker, New Orleans, La. district; J. M. Collins, Kansas City district; R. B. Deacon, Memphis, Tenn. district; H. A. Teigen, San Francisco, Calif. district; and E. T. McFate, Buffalo, N.Y. district.

Highway program film

"THE ROAD AHEAD," a color motion picture designed to explain the U. S. highway program to the public, has recently been released by Caterpillar Tractor Co., in cooperation with the U. S. Dept. of Commerce, Bureau of Public Roads.

Narrated by Walter Cronkite, the 23-minute film illustrates how the 41,000 mile road program will be planned, built and used. It shows how completed interstate highways will look and explains provisions of the road program.

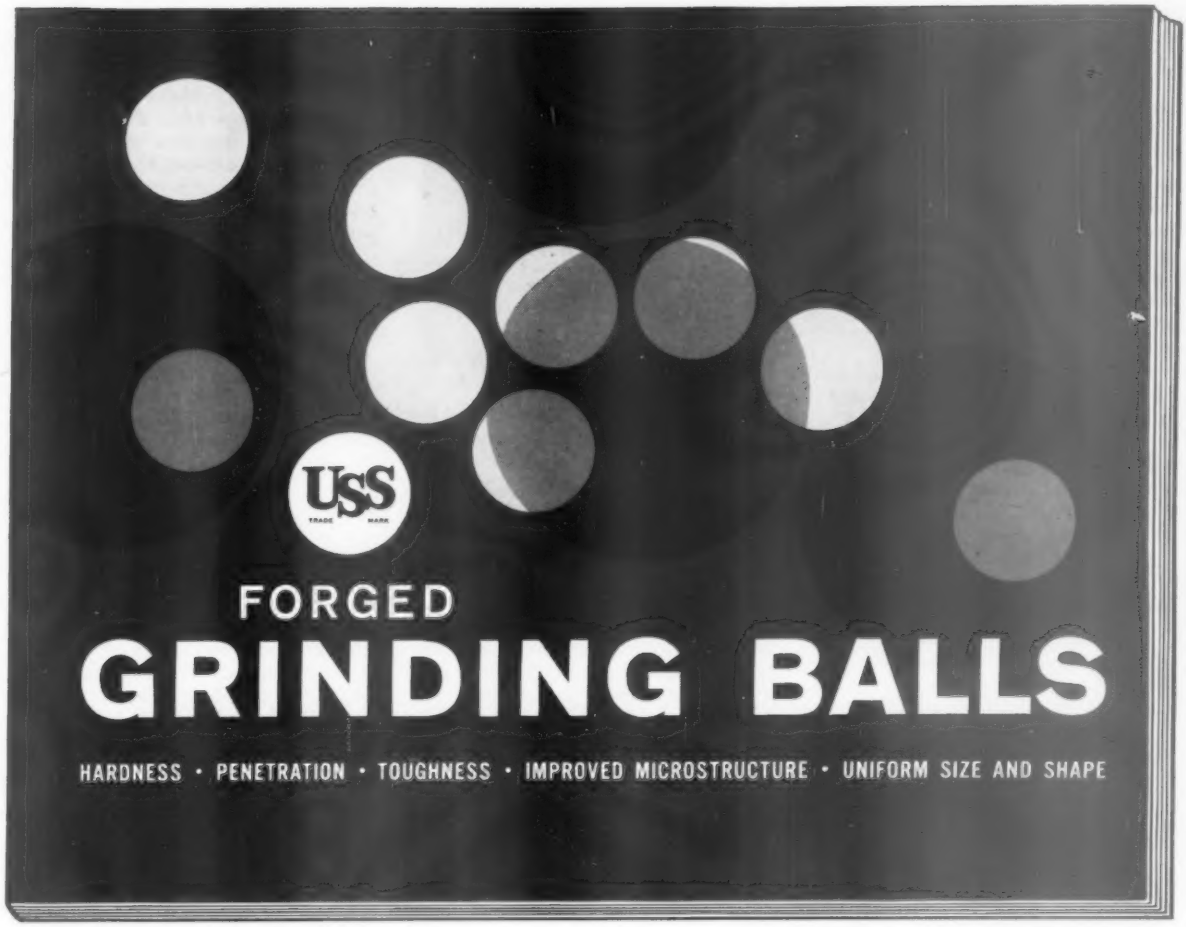
F. K. Platt named manager

FRANK K. PLATT, president of Air Engineering Co., Kalamazoo, Mich., has been named to the newly created post of central regional manager for all products of American Air Filter Co., Inc. Mr. Platt has relinquished his affiliation with Air Engineering to make his new headquarters in Detroit, Mich.

Baker-Raulang appointments

RICHARD T. TIEBOUT has been appointed director of sales according to an announcement by Eugene Caldwell, president of The Baker-Raulang Co., Cleveland, Ohio. Mr. Tiebout replaces G. B. Davis, who recently resigned. Also announced was the appointment of Robert J. Laws as assistant director of sales. Mr. Laws, who joined the company in 1955, was manager of sales engineering.

(Continued on page 206)



New Free Booklet shows why

USS Forged Steel Grinding Balls are your best buy!

THIS NEW 16-PAGE BOOKLET tells how USS Grinding Balls are made and what tests are applied to maintain grinding ball quality. It lists the chemical compositions of both the Carbon-Manganese and Alloy grades of USS Forged Steel Grinding Balls, pictures the modern heat-treating facilities, and charts the results of both Brinell and Rockwell hardness tests obtained from typical grinding balls before shipment from our plant.

This kind of data is only part of the information to be found in our new illustrated booklet describing USS Grinding Balls, their characteristics and manufacture. We will gladly send you a free copy. Just fill in the coupon at right.

United States Steel Corporation
525 William Penn Place, Room 5682
Pittsburgh 30, Pennsylvania

Please send me a copy of
"USS Forged Grinding Balls."

Name .....

Company .....

Address .....

City ..... **State** .....

USS FORGED GRINDING BALLS

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U N I T E D S T A T E S S T E E L

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MANUFACTURERS NEWS

(Continued from page 204)

Link-Belt in Brazil

LINK-BELT CO. will open a subsidiary in Sao Paulo, Brazil, which will service the Brazilian and South American markets now being handled through that company's Export Division. The new operation will be in a position to take advantage of the rapid industrial and population growth of Brazil, one of the fastest growing Latin American countries.

Resident Manager will be J. Ross Arnold, who is district sales manager in Birmingham, Ala. Mr. Arnold is a specialist in materials handling equipment who gained his experience in engineering sales in the Buffalo and Pittsburgh offices before his appointment to Birmingham.

Motorola sales expansion

MOTOROLA COMMUNICATIONS AND ELECTRONICS, Inc. Chicago, Ill. has broadened its management organization by the appointment of Homer L. Marrs as vice president and operations manager, and Harold A. Jones, former staff director of sales, as vice president and midwestern area sales manager.

Hercules acquisition

HERCULES MOTORS CORP., Canton, Ohio, will take over the manufacture of two air-cooled industrial engines, now being made by Lycoming Division, Avco Manufacturing Corp., Williamsport, Pa.

It was announced that Hercules had acquired the tools, dies, patterns and inventory and hoped to start production of engines in Canton March 1.

Lamson district manager

THE APPOINTMENT of Edward W. Haskell as district manager for the west central region, Lamson Mobilift Corp., Portland, Ore., has been announced. Mr. Haskell, who formerly served as district manager for the east central district, has been with the firm since 1956.

Hoffman factory completed

COMPLETION of its new factory has been announced by Hoffman Bros. Drilling Co., Punxsutawney, Pa., producers of diamond bits. The new facilities include equipment for setting, heat treating, testing, tooling and design, with emphasis on research.

R. P. Miller made manager

FULLER COMPANY, Catasauqua, Pa., has announced the appointment of Robert F. Miller as advertising manager. Mr. Miller, who joined the company in 1954 as assistant advertising manager, replaces Russell Hawk, who retired after 22 years of service. Prior to joining Fuller, Mr. Miller was with Yale and Towne Mfg. Co., Philadelphia, Pa., for eight years as assistant manager in the advertising, publicity and market research department.

New CEA officers

RALPH E. KEIDEL, manager of advertising and sales promotion for Euclid Div. of General Motors, Cleveland, Ohio, was elected general chairman of Construction Equipment Advertisers, succeeding M. B. Jaeger of Bucyrus-Erie Co., Milwaukee, Wis.

Other newly elected officers are R. Koehler, Westinghouse Air Brake Co., program chairman; Madison Crawford of F. G. Hough Co., secretary, and Don Orlaska of Andrews Agency, Milwaukee, treasurer.

Fuller personnel changes

FULLER MANUFACTURING CO., Transmission Div., Kalamazoo, Mich., has announced several changes in personnel responsibilities. W. E. Niness, vice president, formerly in charge of sales, has been moved to a staff position. This change is made in preparation for his retirement which will take place later this year.

J. A. Packard, manager of original equipment sales, has been promoted to general sales manager. L. C. Butler, manager of service sales, has been promoted to the position of assistant to the general sales manager.

Corresponding changes in the company's service organization are as follows: B. S. Tooker, general service manager; R. E. Olmstead, technical service manager; K. B. Klump, service parts manager.

Du Pont promotions

ROBERT L. HERSHEY, general manager of the polychemicals department, E. I. du Pont de Nemours and Co., Inc., Wilmington, Del., was elected a director, vice president and member of the executive committee. Mr. Hershey joined the company in 1936 and held various research and management positions until his recent promotion.

WALTER H. SALZENBERG, assistant general manager of the polychemicals department, was appointed to succeed Mr. Hershey as general manager.

Also announced was the retirement of William H. Ward as a vice president and member of the executive committee after a career of 42 years with the company. Mr. Ward will retain his position as a director.

W. C. Schumacher named executive vice president

THE ELECTION OF W. C. Schumacher as an executive vice president and member of the board of directors of International Harvester Co., Chicago, Ill., has been announced by John L. McCaffrey, chairman of the board. Mr. Schumacher formerly served as a vice president and executive head of its motor truck division.

Schield Bantam sales school

A NEW SALES-SERVICE training school has been announced by the Schield Bantam Co., Waverly, Iowa. Although several training programs have been used in the past throughout the distributor organization, this is the first time that a formal sales-training program will be offered at the factory. Classes in the school started the first week in January with additional three-day sessions scheduled at intervals throughout the winter and early spring.

New Crown Zellerbach plant

CROWN ZELLERBACH CORP. has started production in its new $4,000,000 multiwall bag plant at Bogalusa, La. W. H. Maxwell, who joined the company in 1947, will head the plant as superintendent.

Eagle appointments

EAGLE IRON WORKS has announced the appointment of L. A. Steinbach to the position of manager of parts and service, a newly created department of the company. Also announced, was the appointment of M. N. Cunningham as production manager.

(Continued on page 208)

"Not merely to sell; but to serve . . . not only to make good steel products; but to make them still better. . . not only to fulfill today's requirements; but to anticipate tomorrow's—these are the principles that constantly guide CF&I."

G. F. Franz
President

We've taken our own advice

When any business is "soft", management often uses this period to clean house. All operating methods are examined carefully with an eye toward increasing efficiency by revising or eliminating those practices that hamper productivity—practices that could not be corrected during peak periods.

In the past, there have been times when the demand for CF&I Grinding Balls has exceeded our capacity, and you have had to wait for deliveries. More recently, demand has been off somewhat, and we have utilized this period to improve our own production efficiency, and new equipment has been added to increase our volume. Now we are in a position, when the demand again picks up, to offer you greater production and quicker deliveries from our enlarged stocks of grinding balls. Thus, we have "anticipated tomorrow's requirements"—we have taken our own advice.

We feel sure that most grinding mill operators follow these procedures—that they *do* make a drive toward increased efficiency during slack periods, so that they will be all the more prepared for periods of intensive output. To help you do this, CF&I has instituted this two-pronged service program:

1. **Engineering Service** . . . CF&I's Mining Products Engineers are ready to analyze your grinding mill problems; make recommendations on how you can improve your operations.
2. **Technical Information** . . . CF&I is currently preparing a series of advertisements containing technical information on ways to improve grinding mill operations.

Take advantage of our Engineering Service and look for the ad series in this publication . . . they'll be appearing regularly during 1958 and reprints will be available. The nearest CF&I sales office will be glad to service your needs.

Other CF&I Steel Products for the Cement Industry

CF&I Grinding Rods • CF&I Rock Bolts • Wickwire Rope
CF&I Mine Rails and Accessories • CF&I Industrial Screens
Realock Fence and Fabric • Grader Blades and other Cutting Edges

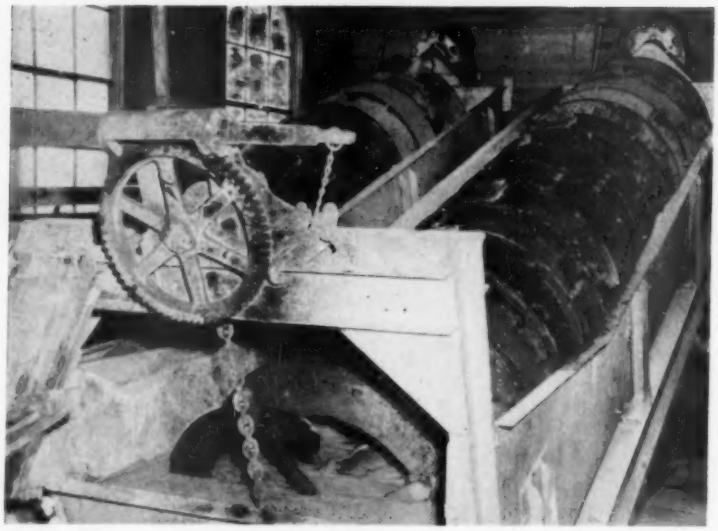
FORGED STEEL GRINDING BALLS
THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Grand Junction Houston • Kansas City • Lincoln (Neb.) • Los Angeles • New Orleans • New York • Oakland • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

5662-B

Enter 1058 on Reader Card

AKINS' efficient classification proved by 18 YEARS SERVICE at Deckers Creek Sand Co.



TWO REPEAT ORDERS

The Deckers Creek Sand Co., near Masontown, West Virginia, is a prominent producer of silica sand. In 1938 they purchased three Akins Classifiers. Based upon the results obtained with these the company has since purchased four additional Akins.

FLOWSHEET

Modern methods of washing, classifying, and rod-mill grinding are used. The crusher product goes to 48" Akins Classifiers which make a sand-slime separation. The sand product is fed to a 5'x10' Marcy Rod Mill, with the discharge going to vibrating screens which make a 30-mesh separation. The +30-mesh goes to aggregate plants and —30 mesh to a 54" Akins Classifier. The sands from this classifier are fed to a 48" Akins which makes the final product...5% +30-mesh x 94% +80 mesh.

For efficient classification, long operating life

SPECIFY AKINS

THE ORIGINAL SPIRAL CLASSIFIER

COLORADO IRON WORKS CO.

P. O. Box 9041 • 3800 Race • Denver 16, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

Sales Agents and Licensed Manufacturers in Foreign Countries

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

Enter 1112 on Reader Card

MANUFACTURERS NEWS

(Continued from page 206)

New Chain Belt officers

THE APPOINTMENT of an executive vice president and three new vice presidents at Chain Belt Co., Milwaukee, Wis., has been announced by L. B. McKnight, president. O. W. Carpenter, formerly vice president, construction machinery and finance, is now executive vice president, with direct responsibility for current operations of the company. Mr. Carpenter joined the firm in 1943 as assistant to the vice president, and was elected vice president and a director in 1948.

Vice presidential appointments included: W. C. Messinger, promoted from manager, construction machinery division, to vice president, construction machinery section; E. M. Rhodes, former manager of the industrial equipment section, is now vice president of the section; and G. H. Woodland has been advanced from general sales manager, industrial equipment section, to vice president of marketing.

Appointed sales manager

GEORGE C. LICHTY, active in all phases of industrial lift truck sales and service for more than 15 years, has been appointed Northwestern district sales manager for lift trucks of the Yale Materials Handling Division, The Yale & Towne Mfg. Co. In his new post, Lichty will be in charge of representative activities in Oregon, Washington, Idaho, Montana and the Canadian provinces of Vancouver, British Columbia and Alberta.

J. W. Miller new manager

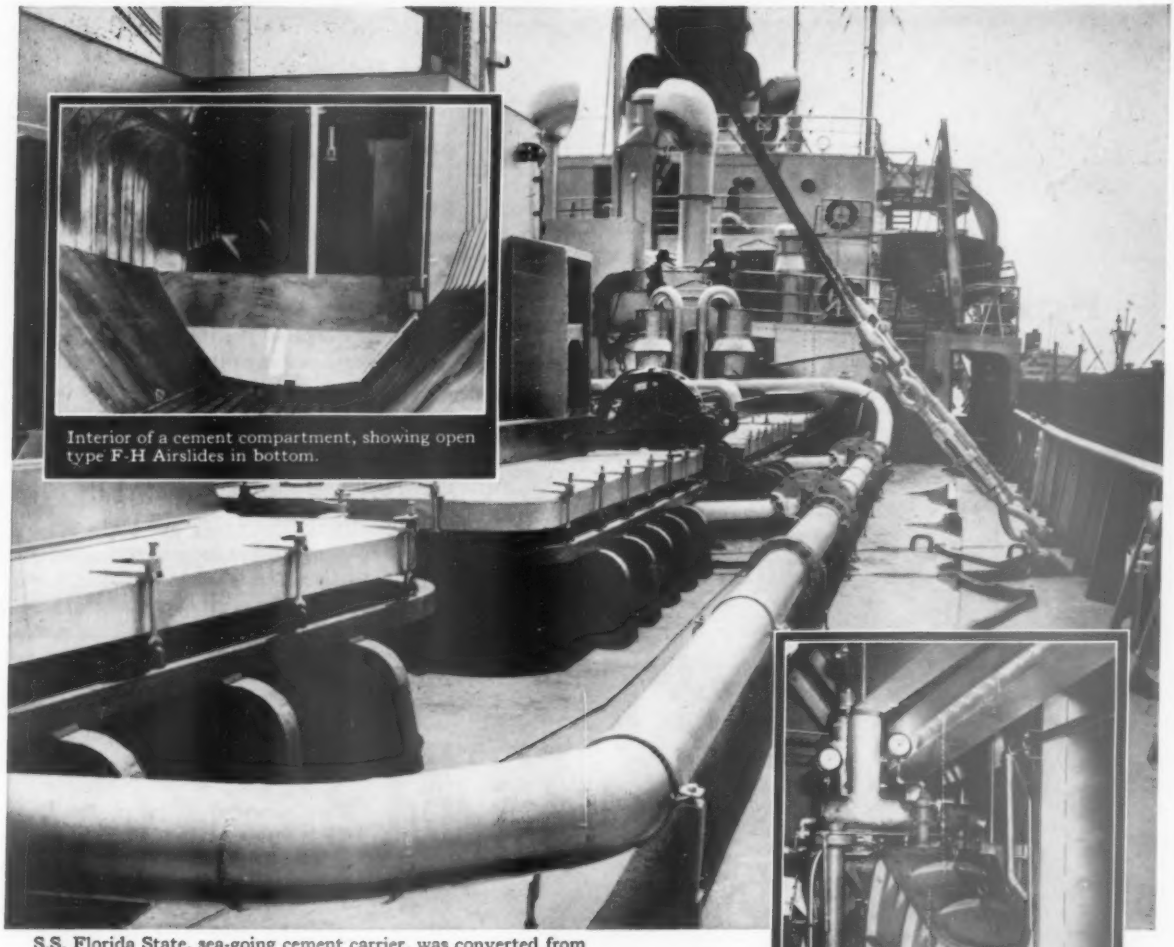
THE APPOINTMENT of J. Wade Miller, Jr., as manager of the central services division, Dewey and Almy Chemical Co. Division of W. R. Grace & Co., Cambridge, Mass., has been announced. Formerly manager of the industrial relations department, Mr. Miller replaces Edward L. Mears, who was named general manager, container and chemical specialties division.

M. Yost made sales manager

M. J. YOST HAS BEEN NAMED sales manager for industrial engines of the Marine and Industrial Engine Div., Chrysler Corp., Detroit, Mich.

Mr. Yost, who has been with the company for 30 years, had been manager of the west coast office since 1956.

END



Interior of a cement compartment, showing open type F-H Airslides in bottom.

S.S. Florida State, sea-going cement carrier, was converted from a Liberty ship by Todd Shipyards Corp., Brooklyn, N. Y. Naval Architects: Theodore E. Ferris & Sons, New York.

One of four Fuller-Kinyon Pumps aboard ship. Also shows F-H Airslides above pump, which convey cement from bulk compartments to the pump.

CEMENT SHIP HANDLES BULK CARGO BY AIR with FULLER ENGINEERED equipment

The S.S. Florida State, owned by Ponce Products Inc., plying between Ponce, Puerto Rico and Port Everglades, Florida, is the first sea-going, bulk-cement carrier both loaded and unloaded by pneumatic systems, without any mechanical conveying equipment. Fuller engineered equipment enables this ship to unload 54,000 barrels in 20 hours, overall elapsed time. Over 50 self-unloading ships and barges use Fuller equipment for unloading bulk cement. In addition, many barges are unloaded with the Fuller-Kinyon remote-control unloader.

Cement is trucked from the cement plant of the Ponce Cement Corporation to a transfer station on the Municipal Dock. Four Fuller-Kinyon stationary pumps convey from the dock to the ship's hold.

The hold of the ship is comprised of four compartments, each equipped with open-type F-H Airslide® fluidizing conveyors. The Airslides convey to four Fuller-Kinyon Stationary Pumps, which transfer the cement through 10" transport lines to storage silos on shore. Air supply for the pumps is furnished by eight Fuller Rotary Single-stage Compressors, installed on board the ship. All of these components were designed, engineered and built by Fuller.

For conveying dry bulk materials in special applications, like ship loading and unloading, or in plants ashore, Fuller designing and engineering can solve your problems, economically and efficiently.

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Ford's Sales Message finds the KEY MEN

Thanks to Advertising!

Says Henry Ford II:

"Advertising is an indispensable aid to our sales force."

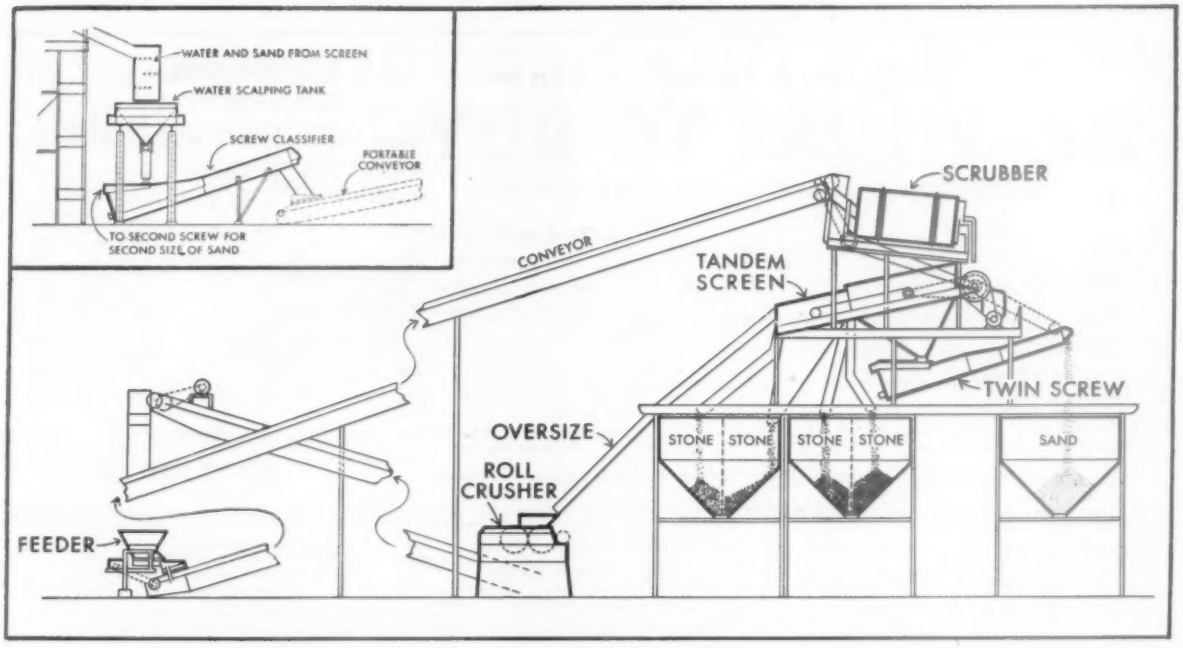
The sale of trucks is a highly specialized field. Especially where large trucks are concerned, we know that performance and utility heavily outweigh the styling and prestige considerations that play such an important role in passenger car sales. Because of this premium on performance and utility, it is rare that one person alone makes the decision to buy a large truck. Our research indicates that an average of five persons collaborate on such a decision, and that they in turn are influenced by three other persons.

Because truck purchases are so largely a matter of group decision making, advertising is an indispensable aid to our sales force. It enables us to get our product story through to all members of the decision-making group —including those members who may not be accessible to our sales personnel. Our salesman may or may not know the key man in the decision-making group, but the right advertising message will find him.

Henry Ford II *President*

Thanks to the advertising pages of the trade press, American Industry today has a wide choice of advanced techniques and improved tools and materials. This speeds production, steps up quality, cuts production costs. Then advertising, in turn, lowers selling costs to the consumer. Result:

AMERICA IS A BETTER AMERICA—
THANKS TO ADVERTISING!



Why this "packaged" washing plant fits big-job operations

Produces up to seven sizes at 150 tph clip

Here's a big package-type washing plant that will supply huge quantities of thoroughly cleaned and sized sand and gravel to fill every demand made by your job, *no matter how big!* It's PIONEER'S new 405-W Washing Plant.

150 tons per hour is a lot of production in any language. **Yet the new 405-W not only gives you this tremendous output but also enables you to produce 2 different sizes of sand and 5 sizes of stone *simultaneously*, including oversize, which you can crush and run back through the screens. If you need fewer sizes, production can be even greater! For example, users report 200 to 215 tons per hour when separating and washing three sizes of gravel and one of sand!**

Secrets of high production

Big-plant proportions are one reason for such high production, but it takes *three* secrets, other than size, to process such huge quantities.

The first secret is the way in which the vibrating screen functions. This 4'x 20' tandem screen simultaneously separates up to 5 sizes of material, plus oversize, chuting four sizes of aggregates to storage bins, one size of sand to the dehydrator, and oversize to the crusher for reduction. A second size of sand can be produced when desired.

Utilization, rather than *rejection* of oversize is the second production secret. All oversize scalped off by the screen is chuted to a PIONEER roll or jaw crusher for reduction and fed back to the plant for re-processing.

Maintaining an even, continuous flow of material through the plant is the third production secret. PIONEER'S Model 30G Mechanical Feeder maintains the steady, even flow necessary for maximum production.

How second size of sand is obtained

Plaster or mason's sand can be produced by the addition of a second dehydrator to receive the overflow of water which carries such material from the first dehydrator. Recovery of this very fine sand results in additional profit to you and completely eliminates any waste. A water scalping tank can be added to the plant for maximum recovery of sand down to 200 mesh or finer. (See inset.)

Other important features

Maintenance costs are low, as all drives are simple. Individual electric motor drives on each unit mean fewer sprockets, shafts, gears, belts and chains to wear out.

Labor costs are low, as 2 operators can control entire plant. One regulates feeding, while the other checks material hauled away.

Additions and alterations are simple to make. Jaw or roll crushers can be added or omitted. Dehydrators and bins may be changed and other units such as a water scalping tank added to meet specific needs. Stockpiling conveyors can be added to handle any or all of the sizes produced.

Varying material specifications are easily met by simply changing screens.

Compact design. *This is a "package" plant, specifically designed to give you maximum plant at minimum cost.* Plant needs space of only 15' x 180'. This lets you set up plant close to pit or water supply.

Semi-portable. All units can be quickly dismantled, moved, and assembled with a crane and transported by truck or semi.

For further information, write or call Pioneer Engineering, Division of Poor & Company, Inc., Minneapolis 14, Minnesota or your nearest PIONEER Distributor.

Pioneer®
EQUIPMENT

PIONEER ENGINEERING, Minneapolis 14, Minnesota
Division of Poor & Company, Inc.
Please send information on equipment checked.

☐ GRAVEL PLANTS	☐ WASHING PLANTS	☐ MECHANICAL FEEDERS
☐ ROCK PLANTS	☐ BITUMINOUS PLANTS	☐ VIBRATING SCREENS
☐ JAW CRUSHERS	☐ APRON FEEDERS	☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS	☐ ORO FEEDERS	☐ CONTINUFLO CONVEYORS

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Column Inches Used	Rate Per Column Inch
1- 3	$9.00
4- 8	8.60
9-14	8.40
15-19	8.20
20-30	7.80

Lower rates on a contract basis. Write for rate card.

Mail to: ROCK PRODUCTS, Where To Buy Dept., 79 West Monroe St., Chicago 3, Illinois

FORMS CLOSE
12th of MONTH
PRECEDING PUBLICATION

Jan.....	July....
Feb.....	Aug.....
Mar.....	Sept.....
Apr.....	Oct.....
May....	Nov.....
June....	Dec.....

CHECK MONTHS AD TO APPEAR

LOCOMOTIVES: One 98 ton diesel electric Switcher, 900 H.P. Two 50 ton and one 80 ton diesel electric with Cummins diesel motors and G.E. electrics. One 35 ton and one 25 ton diesel electric. One 20 ton diesel. One 16 ton gasoline.

ROTARY KILNS & DRYERS: 4½ ft. x 40 ft., 5 ft. x 50 ft. and 8 ft. x 40 ft. Rotary Kilns, all modern, gas fired, complete with all equipment including instruments and controls. One 9 ft. x 120 ft. Two 8 ft. x 125 ft. Two 6'6" x 100 or 120 ft. Two Ruggles Coles Dryers class XA18, 104" dia. x 65 ft., new condition. One Ruggles Coles class XH12, 80" x 60 ft., new 1955. One 6' x 50 ft. Rotary steam dryer and one 6' x 50 ft. rotary cooler.

MINE HOISTS: One 7' x 7' single drum, 400 H.P., 1⅛" rope. One 10' dia., 7' face, single drum with center dividing flange, 400 H.P., 1¼" rope. One 5' dia., 5' face, single drum, with center dividing flang, 100 H.P., 1" rope. One 84" dia., 54" face, double drum, 1⅜" rope, 400 H.P. One 10' dia., 10' face, double clutched drums, 1250 H.P., 1⅜" rope, also, one same as above with 600 H.P. motor. All the above hoists have post brakes, Lilly control, 2200 volts and all are complete.

CLAM SHELL BUCKET: Williams 1¼ yd. capacity, excellent condition.

JAW CRUSHERS: 10 x 15, 10 x 20, 12 x 24, 15 x 36, 24 x 36, 25 x 40, 30 x 42 and 40 x 42". One 18 x 30 and one 24 x 72" sectionalized for underground use.

COMPRESSORS: One Ingersoll Rand PRE-2, 780 H.P., 4500 CFM, 2200 volts. One Ingersoll Rand PRE-2, 500 H.P., 2500 CFM, 2200 volts. One Chicago Pneumatic OCE, 300 H.P., 1500 CFM, 2200 volts. One Joy WN-14 Radial model F, 300 H.P., 2300 volts, 1825 CFM. One Ingersoll Rand XRE, 11 x 12 and 19 x 12, 175 H.P. synchro motor, 300 RPM, with 5 step clearance control.

Above machines are complete with all necessary auxiliary equipment.

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SHOVELS, CRANES & HOES

Sargent "410" New ⅜ yd. Trench Hoe, mounted on new Crane Carrier. Big Discount!
Bantam "M-40" ⅜ yd. Trench Hoe, mounted Reo 6x6 ..... $4000.
Insley "K-12" ½ yd. Dragline or Trench Hoe, Reconditioned ..... $6250.
Marion "331" ¾ yd. Used Shovel or Dragline ..... $6500.
Byers "83" ¾ yd. Used Dragline, 40' Boom ..... $3750.

TRACTORS & LOADERS

Caterpillar "D-4" Diesel Tractor w/Traxcavator Hydraulic Front End Loader, Rebuilt engine & tracks ..... $6500.
Allis-Chalmers "TLW" Used Tractor w/Tractomotive Front End Loader, ¾ yard ..... $2000.
International "TD9" Diesel Tractor w/Bucyrus-Erie Dozer-Loader ..... $3000.
Barber-Greene "545W" Used Rubber-Tired Bucket Loader ..... $2600.
Pettibone "10" Used 1-Yd. Gas Tractor-Shovel, 3 years old ..... $6500.

TRANSIT MIXERS

Rex 3 yd. Hi-Discharge (4¼ yd. Agitator) 1950 model. Mounted Chevrolet 6400 Tandem axle truck ..... $3000.
Jaeger 3 Yd. Hi-Discharge (4¼ yd. Agitator) repaired, biasted & painted. Un-mounted ..$1000.
Jaeger 4½ Yd. Hi-Discharge (6 yd. Agitator) mounted I-H L190 tandem axle truck ..$3750.
Smith 4½ Yd. Hi-Discharge (6 yd. Agitator) mounted White WC-2264 Tandem Axle Truck (2), each @ ..... $4000.
Rex 4½ Yd. Hi-Discharge (6 yd. Agitator), New 1951, Un-mounted (2) each @ .....$1500.

MISCELLANEOUS

Universal "916" R. B. Jaw Crusher .....$ 750.
Gruendler Port. Pulverizing Plant, 3 x 8 feeder, 3 x 8 mill, discharge conveyor, G-M 671 Diesel power, 8 months old.
Dixie Port. Pulverizing Plant, 3 x 8 feeder, 3 x 8 Iowa screen, 3036 mill, discharge conveyor, GM-671 Diesel power, completely overhauled.
Austin-Western "88" 4-Wheel Drive Motor Patrol, 12' Blade, Cab, Scarifier .....$1500.
Leland 20-Ton Lowboy Drop Deck Tandem Axle Semi Trailer .....$2250.
Pettibone-Wood "820A" New Windrow Proportioner. Reduced for quick sale.
Pettibone-Wood "P620" Used Preparizer. G-M Diesel power. Will rent or sell.

NOTE: All This Equipment Located in our Yard.

EIGHMY EQUIPMENT COMPANY
120 S. Pierpont . Phone 4-6706
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OUR 50TH YEAR

Ty-Rock F600 Screen 4' x 10'
Two Type 38 Hummer Screens 4' x 10'
Seco Screen 4' x 14' triple deck
Seco Screen 4' x 8' double deck
Deister 3 Deck 5' x 10' Screen
Kennedy #19 Secondary Crusher
Jeffrey 24" x 18" Pulverizer
Acme 9" x 16" Jaw Crusher
Climax 10" x 20" Jaw Crusher
Cedar Rapids 9" x 12" Jaw Crusher
Williams Hammermills 50 to 100 H.P.
Farrel 24" x 13" Blake Crusher
Farrel 36" x 10" Blake Crusher
Sturtevant #1 Rotary Crusher
8" x 27' Enclosed Elevator
8" x 29' Enclosed Elevator
8" x 31' Enclosed Elevator
10" x 38' Enclosed Elevator
4" x 33' Enclosed Elevator
14" x 39' Enclosed Elevator
6" x 24' Perf. Disch. Encl. Elev.
16" x 30' Perf. Disch. Encl. Elev.
Elevator Chain: C102B-111-102½
Elevator Belt: 475' x 48"
Lippman 24" x 45' Portable Conveyor
Farquhar 24" x 25' Portable Conveyor
Jacketed Screw Conveyor 12"
515' x 30" 6 ply Belt, 90% new.
24, 30, 36 & 42" Idlers, rebuilt.
Syntron Vibrators V125 & V200
Rotary Feeders, 1 to 3 Cu. Ft.
I. R. Tugger Hoists (Air)
American Air Compressor 69 C.F.M.
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Stiffleg Derrick 15 Ton, 110' Boom
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60"x48" to 6"x3"
New and used RELIABLE

"Farrel-Bacon"
Jaw Crushers

BACON-PIETSCH CO., INC.
26 Park St., Montclair, N. J.
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1—Patterson 7x18'—Two Compartment Ball Mill—practically new—spare liners, spare gears—400 HP motor and reducer
1—Atlas 5' Dia—22'6 long Ball Mill—stone lining
1—Schmidt 5'6 Dia—21' long Ball Mill—stone lining
1—25B Telsmith Gyratory Crusher
4—F. J. Mack Dumps—rock bodies
1—Used Northwest Shovel—Model 80D—2½ yd.
1—New Northwest Shovel—Model 80D—2½ yd.
1—Generator—156KVA—240 volt 3 phase 60 cycle Murphy diesel—on rubber tires

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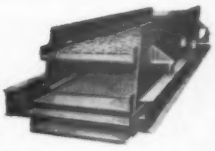
BONDED EQUIPMENT BARGAINS

NEW CURRENT MODELS IMMEDIATE SHIPMENT FROM OUR FACTORY
WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

NEW BONDED® HEAVY DUTY VIBRATING SCREENS

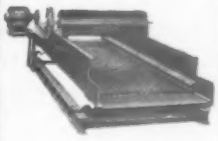
BUY WITH CONFIDENCE. REFERENCES ARE: Ohio National Bank, Columbus, Ohio; Dun & Bradstreet



Model Number	No. of Decks	Screening Area	Sale Price
124A	1	2'x4'	$ 443.00
224A	2	2'x4'	472.00
126A	1	2'x6'	472.00
226A	2	2'x6'	501.00
136A	1	3'x6'	581.00
236A	2	3'x6'	688.00
336A	3	3'x6'	956.00
138A	1	3'x8'	675.00
238A	2	3'x8'	815.00
338A	3	3'x8'	996.00
336B	3	3'x6'	1620.00
436B	4	3'x6'	1685.00
138B	1	3'x8'	1510.00
238B	2	3'x8'	1620.00
338B	3	3'x8'	1735.00
248B	2	4'x8'	2310.00
348B	3	4'x8'	2440.00
2410B	2	4'x10'	2400.00
3410B	3	4'x10'	2550.00
2412B	2	4'x12'	2590.00
3412B	3	4'x12'	2970.00
4412B	4	4'x12'	3165.00

HEAVY DUTY MODELS, TYPE B: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. Write for New 8-page Bulletin No. 1087.

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



More than 6000 Mines and Quarries have modernized with Bonded Equipment

GENERAL DUTY SCREENS, TYPE A: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Pre-Fab sections quickly and easily jointed together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2⅞" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

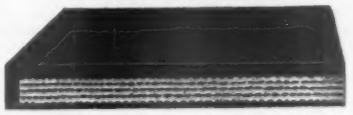
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write for Bulletin #1138.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Bonded troughing idler conveyors are also available with truss type construction. Write for Bulletin #1169 and prices.

NEW CONVEYOR BELTING SAVE UP TO 30%

AND WE PAY THE FREIGHT ON 200 POUNDS OR OVER



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.83
16"	4	4.08	2.97
18"	4	4.51	3.29
20"	4	4.97	3.80
24"	4	5.85	4.26
30"	4	7.18	5.21
36"	4	8.51	6.18

Major Bee Brand: 16# to 19# Average Friction Pull. 2500# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$3.06
16"	4	4.85	3.46
18"	4	5.39	3.83
20"	4	5.90	4.37
24"	4	6.94	4.94
30"	4	8.53	6.07
36"	4	10.09	7.35
24"	5	8.14	5.78

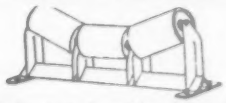
Major Bee-X Brand: 20# to 24# Average Friction Pull. 3500# to 4000# Average Cover Tensile. Skim coat between plies.

A heavier duty 28-oz. duck belt with 1/8" top rubber cover x 1-32" bottom rubber cover. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
16"	4	$5.48	$3.78
18"	4	6.10	4.29
20"	4	6.68	4.79
24"	4	7.87	5.41
30"	4	9.70	6.65
24"	5	9.11	6.31

Other widths, plies, duck weights and cover thickness available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	35.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable prelubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers priced from $61.00. Write For Bulletin #1138.

NEW BONDED BUCKET ELEVATORS

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models mean lower prices and you get a Custom Built Elevator at no extra cost.

There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active. Prices listed below are for Vertical Enclosed Elevator. Other sizes, styles, and types available in both chain and belt type elevators, at equally low prices and will be quoted on request. A complete line of Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices. Write for Bulletin #1203.

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets On Belt			
B53A	5x3½	$1099.00	$20.50
B64A	6x4	1116.50	21.25
B85A	8x5	1311.50	27.25
B106A	10x6	1692.50	33.00
B127A	12x7	1854.50	37.25
Style "E" Continuous Steel Buckets On Chain			
C85E	8x5x 7¾	$1397.00	$31.25
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2—42" x 16" Allis-Chalmers Crushing Rolls, rebuilt. 36" x 16 rebuilt Sturtevant rolls.
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Complete 5 Gramm 78 bbl cement bulkers w. Onan engines and compressors w/air outlets into tanks.
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30 Jaeger, REX, Smith 2 to 6½ cu. yd. high discharge, horizontal, truck mounted.

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JAW: Acme 10x20, 15x36, 14x26, 14x28, 10x42, 18x33, 18x32, 25x40. Eagle 10x16, 20x36. Diamond 24x36". Cedar Rapids 10x20, 15x36, 20x36, 25x40. Farrell 10x20, 18x30, 14x36, 18x36, 36x48. Buchanan Type C 30x42, 36x42. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Pioneer 30x42. Universal 18x24.
GYRATORY: A1-Chal 322, 6", 7½", 8, 9, 9K, 10, 16, 20, 30, 42, Telesmith 8B, 28" Intercone,; Kennedy Van Saun T. 19, 25½-S. 37½, 38; Traylor TY 1¼", 4' Type TS, TY 3', T3 3', T23'.
ROLL: Cedar Rapids 40x29. Pioneer 40x22. Pioneer 30x18. Telsmith 24x16. Universal 40x24, 18x30.
HAMMERMILL: Jeffrey Type B3 24x20, Type B 36x24, 36x36, 36x42, Eagle 24x24, Stedman 24x30, Cedar-Rapids 50-50, 30x33. Penn Model SXR 100
BALL MILL: Hardinge conical 8'x30", 8'x18",Gates 5'x22", Marcy 7', Int. X-18 5'x6'.
TUBE MILLS: 6'6" x 21' Smidth, 5' x 16' A-C.
ROD MILL: 3' x 8' Denver, 3' x 6' Marcy, 4' x 10' J&C (Never used)
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DRYERS: 6'x60', 6'x72', 5'x24', 4'6"x32', 3'6"x20', 6'x30'
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C-B Port. Prim 2036, complete rebuilt. Cat. Diesel.
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C-B 2540 Prim. Port. Diesel
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Cedar-Rapids 3033 hammermill Diesel. Trailer mtd.
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C-B "Pitmaster" 10 x 16 jaw, 16 x 6 roll
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Blaw-Knox 400 bbl cement transfer plant
Johnson 105 ton TY 227 bin TY 168 batcher.
Auto-Crete port. batching plant, self contained, elec. up to 150 yds per day; one man operation.
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1—Buchanan 36" x 48" Jaw Crusher
1—Allis Chalmers 24" x 12" Jaw Crusher
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27½ ton, single-compartment 8' x 12' bin.
60-ton, two-compartment, 8' x 18' storage bin with clam gates.
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Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also conveyor belting.

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Lorain 78-J 1½ yd. diesel dragline.
Lorain 79 1½ yd. diesel shovel.
P&H 655B 1½ yd. diesel dragline.
Bucyrus-Erie 38B, 1½-yard diesel dragline. Rebuilt.
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Link Belt LS-85 ⅜-yard diesel shovel-drag.
Lima 34 Paymaster ¾-yard diesel shovel. Good.
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Lorain TL-20 ¾-yd. diesel backhoe.
Lorain L-26 ¾-yard diesel powered clamshell.
Lorain L-40 ¾-yard diesel clam-drag shovel.
Lorain TL25S ¾-yd. gas clam-crane.
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Koehring 304 ¾-yd. diesel backhoe.
Buckeye 70 ¾-yd. diesel shovel.
Lorain MC-504-W crane clam. Reconditioned.
Lorain MC-414 20-ton Moto-Crane.
Browning T-15-C 17½ ton truck crane.
Link Belt HC-90 25-ton truck crane.
Lorain MC-4 15-ton Moto-Crane.

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1—Euclid 15½-yd. six wheel scraper.
1—Euclid 12-yd. overhung engine scraper.
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1—Euclid 3200 gallon water tank semitrailer.
1—Pullman S-600. 6 to 8 yard scraper.
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1—Adams diesel powered grader.

SHOVEL ATTACHMENTS

Lorain 820, 2-yd., 23' boom, 21' stick.
Lorain 50, 1-yd., 21' boom, 17' stick.
Lorain 40, ¾-yd., 19' boom, 16' stick.
Lorain 30A, ½-yd., 16' boom, 13'4" stick.
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Lorain 40A, 18' boom, 7' stick, 28", 36" or 44" bucket.
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1 Screen, 3' x 10' single deck Allis-Chalmers, low head suspended type,

1 Bucket, 1¼ yard capacity for Lull shovel loader,

1 Bridge crane, Euclid Crane and Hoist Company, Cleveland 20 ton capacity, 25' span, manually operated hoist and travel, Serial No. 9535 and

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4' x 20', 5' x 25', 6' x 72', 8' x 150', 11' x 200'

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2—4 x 8 Seco 2 Deck. 1—4 x 14, 3 Deck.

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1—Allis-Chalmers Jaw Crusher, Blake Type 10" x 20"
1—Reliance Jaw Crusher 15" x 30"
1—36" x 20' Revolving Screen
1—36" x 11' Revolving Screen with Scrubber
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1—3' x 5' Link-Belt Foundry Shakeout Screen
1—10" x 20" New Holland Hammer Mill NEW All-Steel & Manganese J. & H. Hammer Mills 5½" x 18"
2—NEW B-G 15" x 36' Bucket Elevators on chain with 10 H.P. new gear head motors
1—18" x 25' Portable Belt Conveyor

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2400 Lima Dragline, 130', 5 yard.
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80-D Northwest 2½ yd. Standard Shovel.
51-B Bucyrus Erie 2 yd. Standard Shovel.
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Unit 1020 ¾ yard Shovel.
Also, various smaller Shovels & Drags.
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Both of above are direct coupled mounted on I-R frame, and have line starters. Like new condition.

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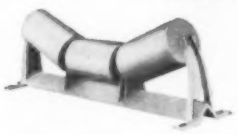
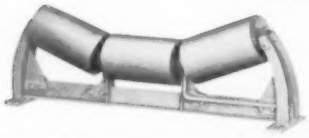
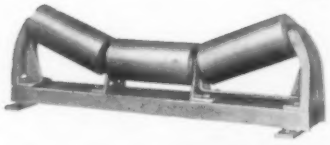
NEW 50 	General duty conveyor • for maximum loads of 100 lbs. per cubic foot • for moderate lump sizes	Designed for conveyors carrying medium loads or for installations requiring intermittent operation.
100 	"Round-the-clock work horse" • handles all but the heaviest and coarsest materials	Coal, coke, sand, gravel, iron ores, sinter, taconite, potash.
200 	Rugged heavyweight • for continuous service • carries the heaviest and coarsest materials	Heavy ores, such as iron, copper, etc. . . . on conveyors employing high-capacity belts.

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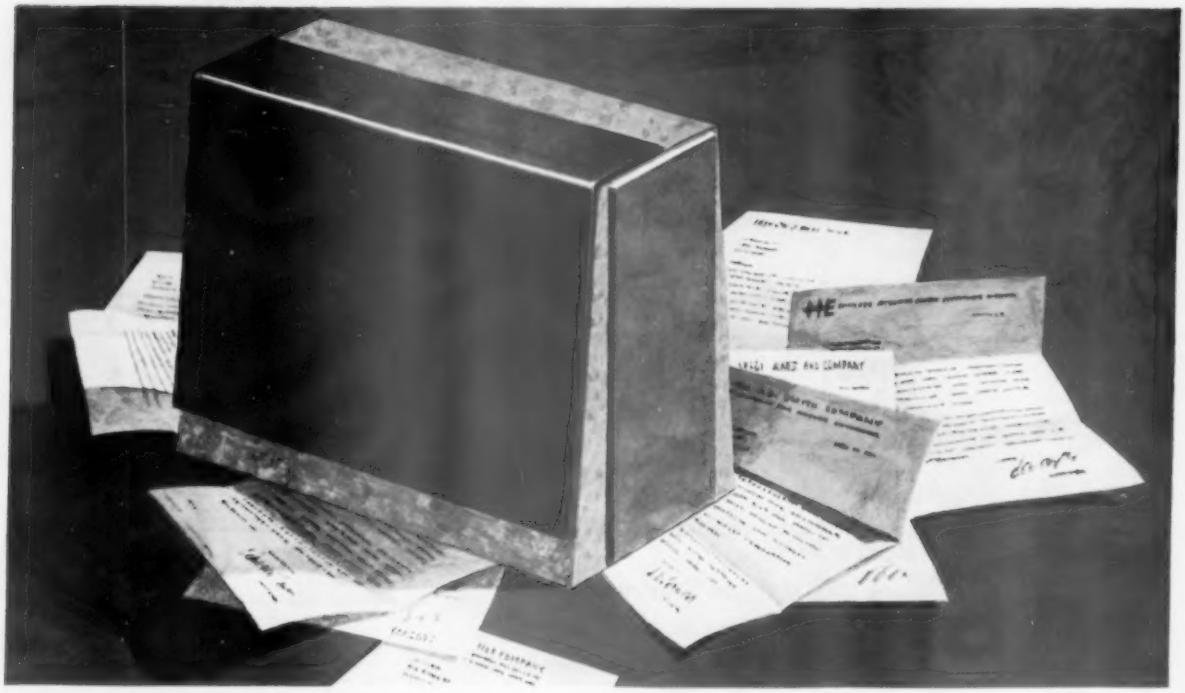

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